OWNER'S OPERATING MANUAL

VX-22d

1080p, 3-chip Digital Light Processing™ Projector and DHD Controller

RUNCO

THE WORLD'S FINEST HOME THEATER PRODUCTS™

TWO YEAR LIMITED WARRANTY

For Projectors, Video Processors and Controllers

Congratulations on your purchase of a Runco video product and welcome to the Runco family! We believe Runco produces "The World's Finest Home Theater Products." With proper installation, setup and care, you should enjoy many years of unparalleled video performance.

This is a LIMITED WARRANTY as defined in the Magnuson-Moss Warranty Act. Please read it carefully and retain it with your other important documents.

WHAT IS COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

SERVICE LABOR: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of manufacturing defect for a period of two (2) years from the effective date of delivery to the end user (excluding the lamp).

PARTS (not including the lamp): Runco will provide new or rebuilt replacement parts for the parts that fail due to defects in materials or workmanship for a period of two (2) years from the effective date of delivery to the end user. Such replacement parts are then subsequently warranted for the remaining portion (if any) of the original warranty period.

PROJECTOR LAMP: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of a manufacturing defect for a period of six (6) months or 1000 hours, whichever comes first, from the effective date of delivery to the end user. In addition, Runco will provide a new or rebuilt replacement lamp for the lamp that fails due to defects in materials or workmanship for a period of six (6) months or 1000 hours, whichever comes first, from the effective date of delivery to the end user. Such replacement lamps are then subsequently warranted for the remaining portion (if any) of the original warranty period.

WHAT IS NOT COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

This Limited Warranty only covers failure due to defects in materials and workmanship that occur during normal use and does not cover normal maintenance. This Limited Warranty does not cover cabinets or any appearance items; failure resulting from accident, misuse, abuse, neglect, mishandling, misapplication, faulty or improper installation or setup adjustments; improper maintenance, alteration, improper use of any input signal; damage due to lightning or power line surges, spikes and brownouts; damage that occurs during shipping or transit; or damage that is attributed to acts of God. In the case of remote control units, damage resulting from leaking, old, damaged or improper batteries is also excluded from coverage under this Limited Warranty.

CAUTION: THIS LIMITED WARRANTY ONLY COVERS RUNCO PRODUCTS PURCHASED FROM RUNCO AUTHORIZED DEALERS. ALL OTHER PRODUCTS ARE SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. MOREOVER, DAMAGE RESULTING DIRECTLY OR INDIRECTLY FROM IMPROPER INSTALLATION OR SETUP IS SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS LIMITED WARRANTY. IT IS IMPERATIVE THAT INSTALLATION AND SETUP WORK BE PERFORMED ONLY BY AN AUTHORIZED RUNCO DEALER TO PROTECT YOUR RIGHTS UNDER THIS WARRANTY. THIS WILL ALSO ENSURE THAT YOU ENJOY THE FINE PERFORMANCE OF WHICH YOUR RUNCO PRODUCT IS CAPABLE WHEN INSTALLED AND CALIBRATED BY RUNCO AUTHORIZED PERSONNEL.

RIGHTS, LIMITS AND EXCLUSIONS:

Runco limits its obligations under any implied warranties under state laws to a period not to exceed the warranty period. There are no express warranties. Runco also excludes any obligation on its part for incidental or consequential damages related to the failure of this product to function properly. Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages. So the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

EFFECTIVE WARRANTY DATE:

This warranty begins on the effective date of delivery to the end user. For your convenience, keep the original bill of sale as evidence of the purchase date.

IMPORTANT – WARRANTY REGISTRATION:

Please fill out and mail your warranty registration card. It is imperative that Runco knows how to reach you promptly if we should discover a safety problem or product update for which you must be notified.

CONTACT A RUNCO AUTHORIZED SERVICE CENTER TO OBTAIN SERVICE:

Repairs made under the terms of this Limited Warranty covering your Runco video product will be performed at the location of the product, during usual working hours, providing location of product is within normal operating distance from a Runco Authorized Service Center. In some instances it may be necessary for the product to be returned to the Runco factory for repairs. If, solely in Runco's judgment, location of product to be repaired is beyond normal operating distance of the closest Runco Authorized Service Center, or the repair requires the unit be returned to the Runco factory, it is the owner's responsibility to arrange for shipment of the product for repair. These arrangements must be made through the selling Runco Dealer. If this is not possible, contact Runco directly for a Return Authorization number and shipping instructions. Runco will return product transportation prepaid in the United States, unless no product defect is discovered. In that instance, shipping costs will be the responsibility of the owner.

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Runco International products are manufactured under one or more of the following patents: US. Patent 6755540 and Other Patents Pending.

ADDITIONAL INFORMATION:

To locate the name and address of the nearest Runco Authorized Service Center, or for additional information about this Limited Warranty, please call or write:

RUNCO INTERNATIONAL, INC.
Attn: Customer Service Department
2900 Faber Street
Union City, CA 94587
Ph: (510) 324-7777
Fax: (510) 324-9300
Toll Free: (800) 23-RUNCO

RUNCO VIDEO-PRODUCT INFORMATION
RETAIN THIS INFORMATION FOR YOUR RECORDS

_____ _____

Model Purchased Date

_____

Serial Number

_____

Runco Authorized Dealer Name

_____

Address

_____ _____ _____

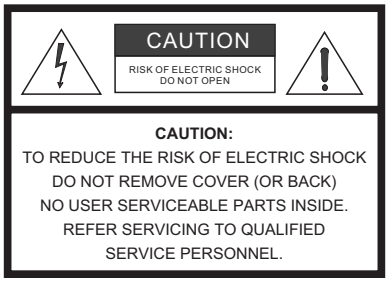
City State/Province Postal Code

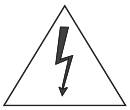
_____ _____

Phone Fax

Safety Precautions

Thank you for your purchase of this quality Runco video projector! It has been designed to provide you with the quality of video that is expected in a home theater. For the best performance, please read this manual carefully as it is your guide through the menus and operation.





WARNING
This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Do not use this equipment near water, outdoors or otherwise exposed to the elements.
5. Clean only with a dry cloth.
6. Do not block any ventilation openings.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety feature of the polarized or grounding type plug. A polarized type plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for the replacement of the obsolete outlet.
9. The 12V trigger only outputs DC 12V signal for triggering. Do not connect to any other power input or output. This could cause damage to this unit.
10. Only use accessories specified by Runco International.
11. Keep the packing material in case the equipment should ever need to be shipped.
12. Unplug this projector during lightning storms or when it will not be used for an extended period of time.
13. The lamp becomes extremely hot during operation. Allow the projector to cool down for approximately 45 minutes prior to removing the lamp assembly for replacement. Do not operate lamps beyond the rated lamp life. Excessive operation of lamps beyond rated life could cause them to explode in rare occasions.
14. Refer all servicing to qualified service personnel. Servicing is required when the projector has been damaged in any way, objects have fallen or spilled into the projector, the projector has been exposed to rain or moisture, does not operate normally, or has been dropped.

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Notes:

1. Introduction

1.1 About This Manual

This Owner's Manual describes how to install, set up and operate the Runco VX-22d DLP Projector and DHD Controller. Throughout this manual, the Runco VX-22d DLP Projector and DHD Controller are referred to collectively as the "VX-22d."

➤ ***Target Audience***

Runco has prepared this manual to help home theater installers and end users get the most out of the VX-22d.

Runco has made every effort to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time. You can always find the latest version of this and other Runco product manuals on-line, at www.runco.com.

➤ ***If You Have Comments About This Manual...***

Runco welcomes your comments about this manual. Send them to techpub@runco.com.

➤ ***Textual and Graphic Conventions***

Text Conventions: The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote and built-in keypad button identifiers are set in upper-case bold type; for example, "Press **EXIT** to return to the previous menu."
- Computer input (commands you type) and output (responses that appear on-screen) is shown in monospace (fixed-width) type; for example: "To change the aspect ratio to Letterbox, type `SAR 2`**`<Enter>`**."
- All keys with functional names are initial-capped, set in bold type and enclosed in angle brackets. These keys are the following: **`<Enter>, <Spacebar>, <Control>, <Esc>`** and **`<Tab>`**.
- **`<Enter>`** indicates that you may press either the RETURN or ENTER key on your keyboard if it has both keys.

In addition to these conventions, underlining, boldface and/or italics are occasionally used to highlight important information, as in this example:

Note

*A carriage return **must** be used after each command or string.*

Graphic Conventions: These symbols appear in numerous places throughout the manual, to emphasize points that you must keep in mind to avoid problems with your equipment or injury:

Tip	*TIPS highlight time-saving short cuts and helpful guidelines for using certain features.*
Note	*NOTES emphasize text with unusual importance or special significance. They also provide supplemental information.*
Caution	*CAUTIONS alert users that a given action or omitted action can degrade performance or cause a malfunction.*
WARNING	*WARNINGS appear when a given action or omitted action can result in damage to the equipment, or possible non-fatal injury to the user.*
DANGER!	*DANGER appears when a given action can cause severe injury or death.*

1.2 Using This Manual

Use the following table to locate the specific information you need in this manual.

If you need...	... Turn to page:
Information about obtaining service	iv
General information about the VX-22d DLP Projector and DHD Controller	3
Installation instructions	15
First-time configuration instructions	45
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1.3 Description, Features and Benefits

Runco further solidifies its leadership role with the introduction of the Video Xtreme™ VX-22d Digital Light Processing (DLP™) Projector. This overachiever combines state-of-the-art, 1920x1080 SuperOnyx™ DLP™ resolution with advanced 3-chip engineering. The results are simply stunning, with jaw-dropping images that must be seen to be believed!

Runco has taken 1080p performance to a new level with this machine and harnessed the brightness and contrast capabilities inherent in 3-chip light engine design for a powerful presentation.

The VX-22d comes with an external, all-digital signal processor/controller featuring advanced Vivix II™ video processing, superb scaling and aspect ratio control. The VX-22d is enhanced further by significant horizontal and vertical lens shift capability for maximum installation flexibility.

The VX-22d's 16:9 native aspect ratio DMD array makes it ideal for widescreen viewing, while its 3-chip, 1920 x 1080 native resolution produces crisp, crystal clear high-definition images with richly saturated colors, deep black levels and natural, highly refined detail.

This advanced design provides pure digital connections from input to light engine for absolutely stellar pictures. In addition, Runco's multiple aspect ratio control includes its unique VirtualWide™ mode for viewing standard video formats in widescreen without loss of image quality.

For uncompromising widescreen reproduction of movies originally filmed in the "scope" (2.35:1) format, the VX-22d can be equipped with Runco's patent-pending CineWide™ with AutoScope™ technology, a combination of software, electronics and high-quality anamorphic optics. CineWide maintains constant height on the screen just as in a movie theater. When a viewer transitions from 1.78:1 (16:9) program material to 2.35:1 material, the image simply gets wider while full height is maintained.

Note

CineWide requires the use of a 2.35:1 or similar aspect ratio superwide format screen.

Discrete IR and RS-232 control make custom installation seamless, while discrete source and aspect ratio selection accommodate any automation control system.

◄ ***Key Features and Benefits***

The VX-22d offers these key features and benefits:

- Native Resolution: 1920 x 1080 (16:9 Native Aspect Ratio)
- Three-chip Digital Light Processing (DLP™) system
- Two HDMI Inputs (on DHD Controller) with High-bandwidth Digital Content Protection (HDCP)
- HDTV Compatible
- CinOptx™ lens options for stunning sharpness and throw distance flexibility

Parts List ➤ Your VX-22d is shipped with the following items. If any items are missing or damaged, please contact your Runco dealer or Runco Customer Service at (800) 23-RUNCO.

- VX-22d DLP Projector and DHD Controller
- Remote Control Unit and two (2), AAA-size batteries
- AC Power Cords for Projector and DHD Controller
- Dual-Link DVI Cable, length specified at time of order; available lengths range from 7.5 meters to 30 meters (24.6 feet to 98.4 feet)
- Rack-mount hardware for the DHD Controller
- Warranty information and registration card
- Runco VX-22d Owner's Operating Manual (this document)

Optional Accessories:

- CineWide™ with AutoScope™ system (secondary anamorphic lens and motorized mount)
- Ceiling mount kit (part number RUHK-004105)
- Cool-cube™ Exhaust Kit

2. Controls and Functions

2.1 VX-22d at a Glance

Figure 2-1 shows the key VX-22d components.

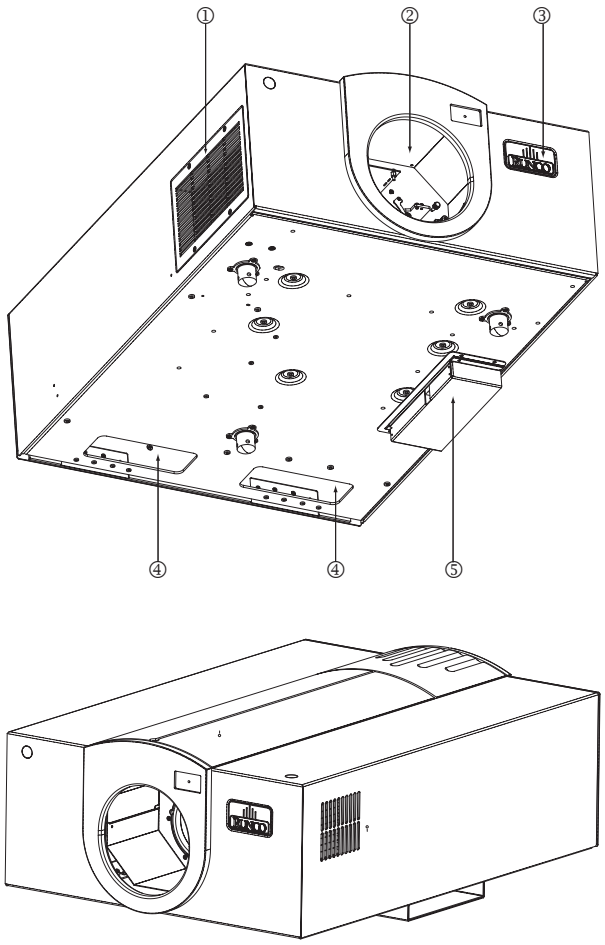


Figure 2-1. VX-22d Front/Bottom/Side View

1. **INTAKE VENT**
2. **LENS OPENING**
3. **RUNCO LOGO**
   The logo can be rotated to match the projector orientation: inverted (ceiling-mounted) or upright. To rotate the logo, grip it at the sides, pull it away from the projector and rotate it 180 degrees.
4. **CABLE OPENING**
   Pass cables through this opening.
5. **EXHAUST VENT**

2.2 VX-22d Rear Panel

Figure 2-2 shows the VX-22d rear panel.

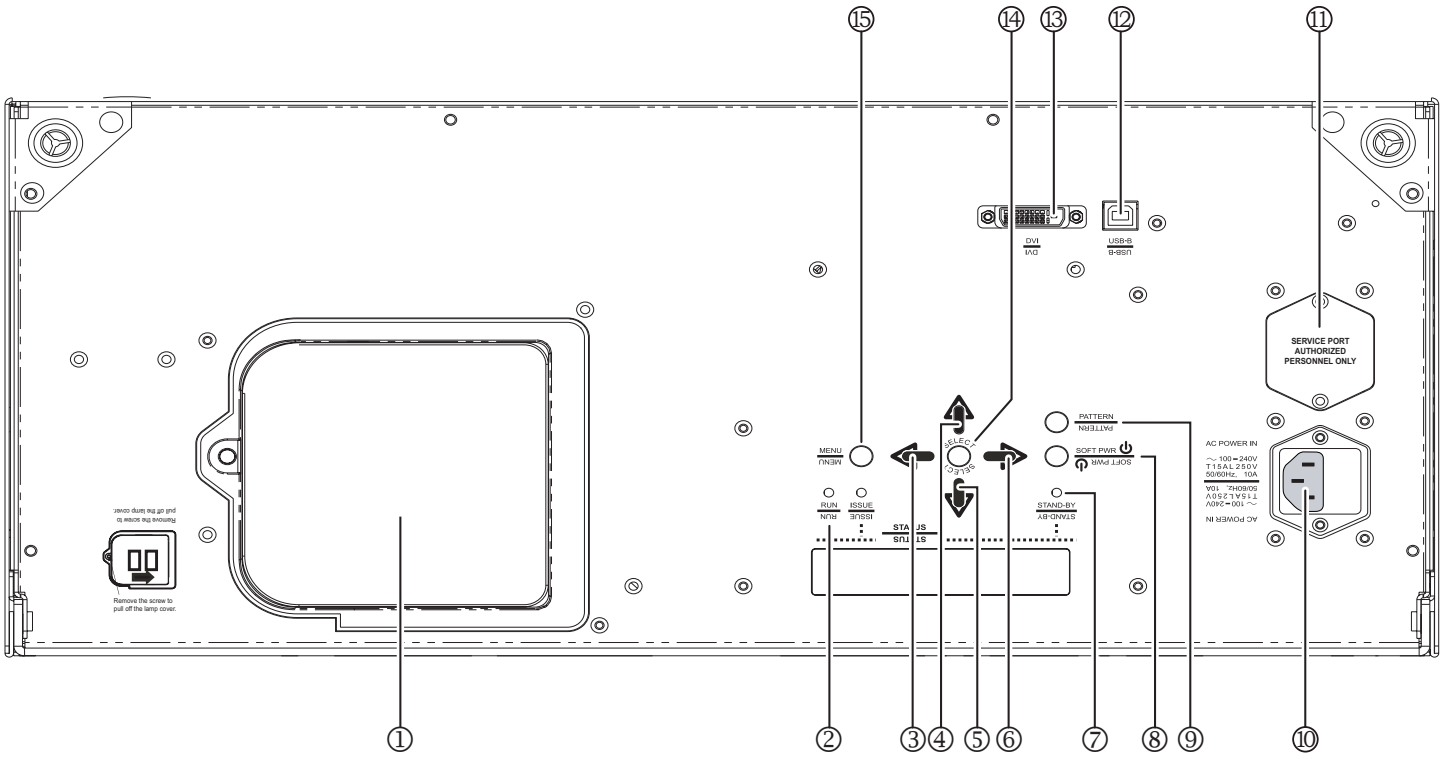


Figure 2-2. VX-22d Rear Panel

1. **LAMP COVER**
   Remove this cover to access the lamp compartment.
2. **RUN LED**
   Lights blue to indicate that the projector is functioning normally.
3. **LEFT BUTTON**
   Used to move the menu cursor left in the VX-22d menu system.
4. **UP BUTTON**
   Used to move the menu cursor up in the VX-22d menu system.
5. **DOWN BUTTON**
   Used to move the menu cursor down in the VX-22d menu system.
6. **RIGHT BUTTON**
   Used to move the menu cursor right in the VX-22d menu system.
7. **STAND-BY LED**
   Lights orange to indicate that the projector is in standby mode.

8. **SOFT POWER BUTTON**
   Press once to turn on the VX-22d. Press it again to put the projector into Standby mode. For a discrete on or off command, you can use the direct access buttons on the remote control (see Figure 2-5).
9. **PATTERN BUTTON**
   Press **PATTERN** to access the internal test pattern menu. Use arrow keys to select a pattern and press **SELECT** to confirm. Press **PATTERN** again to return to the selected source.
10. **POWER INPUT (100 to 240 VAC)**
    Connect the VX-22d to power here.
11. **SERVICE PORT**
    For use by authorized service personnel only.
12. **USB-B**
    High-speed service port (for future use).
13. **DVI-DL (Dual-Link)**
    An HDCP-compliant, dual-link digital video input for connecting the output from the DHD Controller.
14. **SELECT BUTTON**
    Press **SELECT** to confirm your selection of a highlighted choice on the On-Screen Display (OSD).
15. **MENU BUTTON**
    Pressing the **MENU** button brings up the main VX-22d menu. Also, if you are in an adjustment mode or function, pressing **MENU** brings the menu back one level.

2.3 DHD Controller Front Panel

Figure 2-3 shows the controls and indicators on the DHD Controller front panel; the paragraphs that follow describe them.

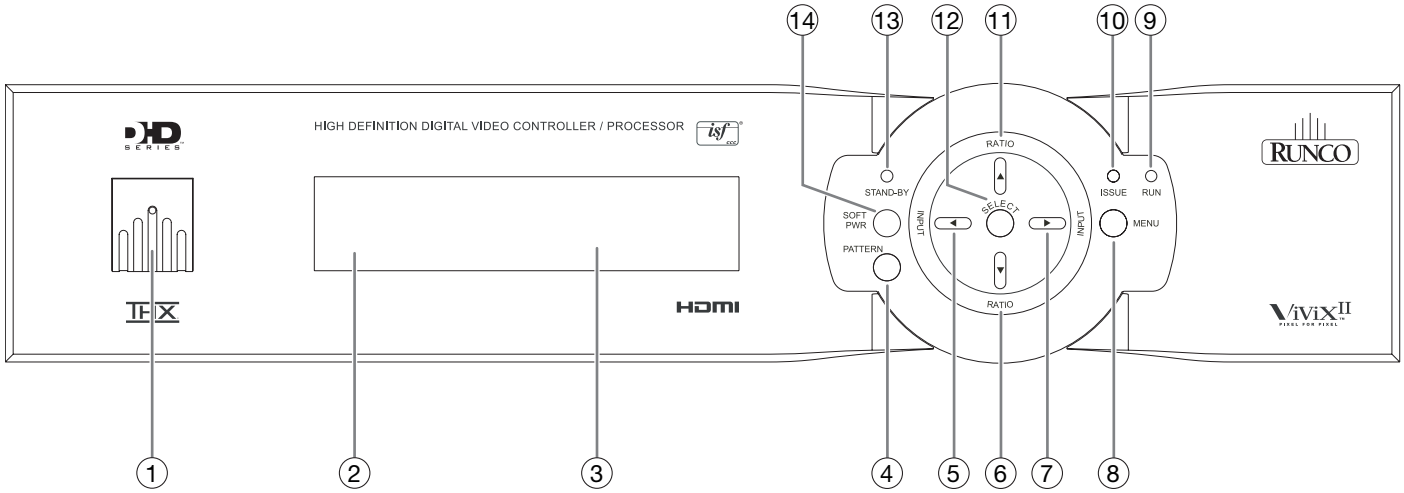


Figure 2-3. DHD Controller Front Panel

1. **RUNCO ICON**
   Lights blue to indicate that the DHD Controller is powered up and functioning normally.
2. **IR SENSOR**
   Receives IR commands from the remote.
3. **VACUUM FLUORESCENT DISPLAY (VFD)**
   Can be used instead of the OSD. Displays currently-selected menu or – if no menu is selected – the current source, input resolution and aspect ratio.

   If an error condition occurs, a message appears here indicating the cause:

   ```
   Please check issue(s)
   Communication Error
   ```

4. **PATTERN BUTTON**
   Press **PATTERN** to access the internal test pattern menu. Use arrow keys to select a pattern and press **SELECT** to confirm. Press **PATTERN** again to return to the selected source.
5. **LEFT BUTTON**
   Used to direct-select inputs or move the menu cursor left in the OSD. When no menu is present on-screen, the **LEFT** button toggles through the different sources, in this order:
   HDMI 2 - HDMI 1 - HD3 (VGA/Y-Pb-Pr) - HD 2 (BNC) - HD 1 (RCA) - S-Video - Composite (VID)

6. **DOWN BUTTON**
   Use to direct-select aspect ratios or move the menu cursor down in the OSD. When no menu is present on-screen, the **DOWN** button toggles through the different aspect ratios, in this order:
   Virtual Cinema - Cinema - VirtualWide - Letterbox - 4:3 - 16:9
7. **RIGHT BUTTON**
   Used to direct-select inputs or move the menu cursor right in the OSD. When no menu is present on-screen, the **RIGHT** button toggles through the different sources, in this order:
   Composite (VID) - S-Video - HD 1 (RCA) - HD 2 (BNC) - HD 3 (VGA/Y-Pb-Pr) - HDMI 1 - HDMI 2
8. **MENU BUTTON**
   Pressing the **MENU** button brings up the main menu. Also, if you are in an adjustment mode or function, pressing **MENU** brings the menu back one level.
9. **RUN LED**
   – Lights blue to indicate that the projector is functioning normally.
   – Flashes blue (one second on/one second off) to indicate an error condition.
   – Flashes blue (one half-second on/one half-second off) for approximately 90 seconds after the system is turned off.
10. **ISSUE LED**
    Lights red to indicate an error condition.
11. **UP BUTTON**
    Use to direct-select aspect ratios or move the menu cursor up in the OSD. When no menu is present on-screen, the **UP** button toggles through aspect ratios in the following order:
    16:9 - 4:3 - Letterbox - VirtualWide - Cinema - Virtual Cinema

    (Virtual Cinema is available only on CineWide-equipped projectors. For more information about aspect ratios, refer to Table 4-1.)
12. **SELECT BUTTON**
    Press **SELECT** to confirm your selection of a highlighted choice on the OSD.
13. **STAND-BY LED**
    Lights orange to indicate that the projector is in standby mode.
14. **SOFT POWER BUTTON**
    Press once to turn on the VX-22d. Press it again to put the projector into Standby mode. For a discrete on or off command, you can use the direct access buttons on the remote control (see Figure 2-5).

2.4 DHD Controller Rear Panel

Figure 2-4 shows the rear connector panel on the DHD Controller.

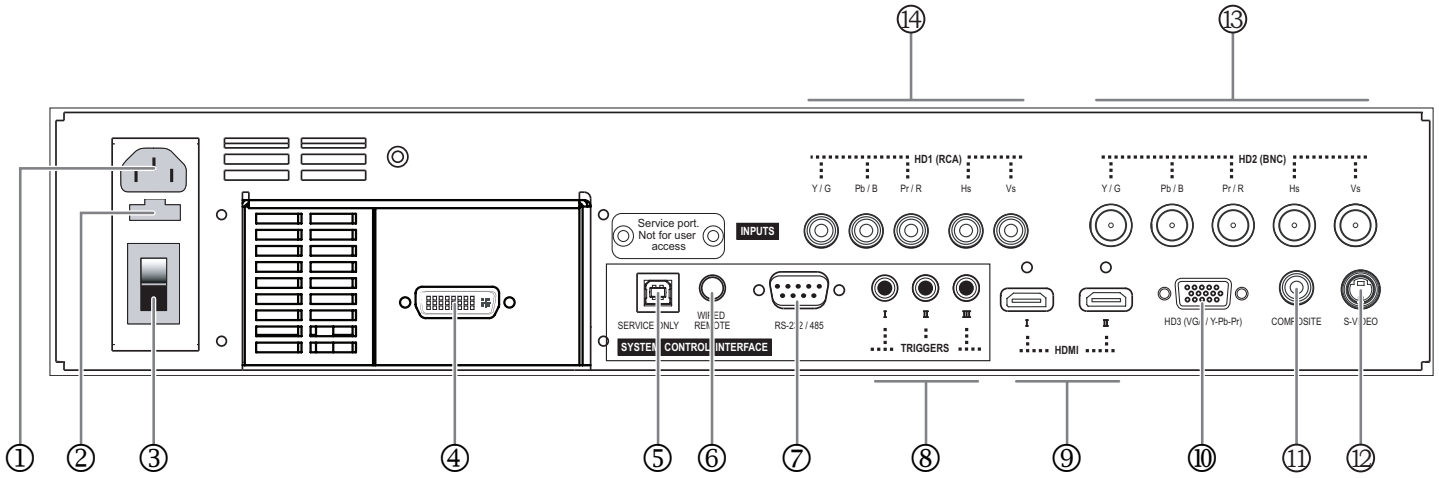


Figure 2-4. DHD Controller Rear Panel

1. **POWER INPUT (100 to 240 VAC)**
   Connect the DHD Controller to power here.
2. **MAIN AC FUSE**
   This is the main AC input fuse (5mm x 20mm, 500 mA, 250V slow-blow).
3. **MAIN POWER SWITCH**
   Disconnects or applies power to the DHD Controller.
4. **DVI-DL (DUAL-LINK) OUTPUT (1080p)**
   Connect this to the DHD Input at the rear of the VX-22d (see Figure 2-2).
5. **SERVICE ONLY**
   For future use.
6. **WIRED REMOTE**
   Wired input from an external remote control or infrared receiver. It is a 3.5-mm, mini phono jack, wired as follows:
   Ring = +5V
   Tip = IR Input (TTL level)
   Sleeve = Ground

   Note *When an external remote control or infrared receiver is connected to the wired IR input, the IR sensor on the front of the DHD Controller is disabled.*
7. **RS-232/485 CONTROL PORT**
   A male, 9-pin D-sub connector for interfacing with a PC or home theater automation/control system. (Currently, only RS-232 interface is supported.)

8. **12-VOLT (750 mA) TRIGGER OUTPUTS**
   Connection for up to three (3), 12-volt trigger-controlled devices. These can be retractable screens, screen masks or the Runco CineWide with AutoScope system.
9. **HDMI I (1) / HDMI II (2) (Digital)**
   Two, HDCP-compliant digital video inputs for connecting a DVD player, HD tuner or other digital video source (up to 1080p) with a DVI or HDMI output.
10. **HD3 INPUT**
    Provides a standard, 15-pin VGA-style connection to either an RGB or component high-definition source, or to a personal computer. The DHD Controller automatically detects the input signal resolution.
11. **COMPOSITE VIDEO INPUT**
    Standard composite video input for connecting a VCR, laser disc player or other composite video source.
12. **S-VIDEO INPUT**
    A standard S-Video input for connecting a DVD player, satellite receiver or Super VHS (S-VHS) VCR.
13. **HD2 INPUT**
    Five BNCs for connecting either RGB or component high-definition sources (up to 1080p). The DHD Controller automatically detects the input signal resolution.
14. **HD1 INPUT**
    Five RCA-type connectors for either RGB or component high-definition sources (up to 1080p). The DHD Controller automatically detects the input signal resolution.

For best results, do not run your DVD player in progressive mode.

2.5 VX-22d Remote Control

Figure 2-5 shows the VX-22d remote control, and the paragraphs that follow describe its functionality.

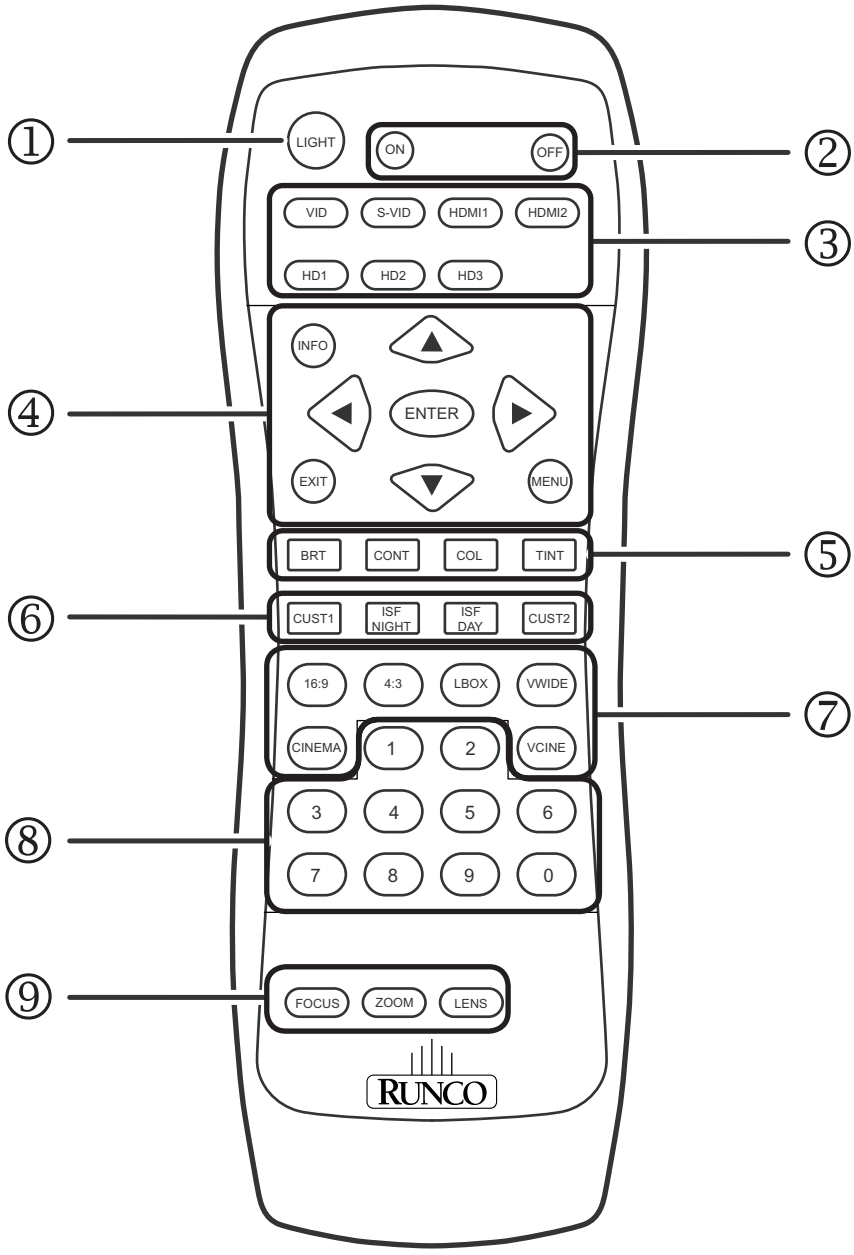


Figure 2-5. VX-22d Remote Control

1. **LIGHT**
   Press to illuminate the buttons.
2. **ON / OFF**
   Use these buttons to turn the projector on or off.
3. **Source Selection Buttons:**

   VID
   Press to select Composite video input as the source.

   S-VID (S-Video)
   Press to select the S-Video input as the source.

   HDMI 1 (I) / HDMI 2 (II)
   Press to select an HDMI input.

   HD 1 / HD 2 / HD 3
   Press to select the HD 1 (RCA), HD 2 (BNC) or HD 3 (PC) video input as the source.
4. **INFO**
   Press to display input signal and product information.

   Cursor Keys (▲, ◀, ▼, ▶)
   Use these buttons to select items or settings, adjust settings or switch display patterns.

   EXIT
   Press to save menu item setting(s), exit the current menu and return to the previous one.

   ENTER
   Press to select a highlighted menu item or confirm a changed setting. This button functions similarly to the **SELECT** button on the projector rear panel (Figure 2-2) or DHD Controller front panel (Figure 2-3).

   MENU
   Press this button to show or hide the OSD controls.
5. **Picture Adjustment Buttons:**

   BRT (Brightness)
   Press to adjust black level.

   CONT (Contrast)
   Press to adjust white level.

   COL (Color)
   Press to adjust color intensity.

   TNT (Tint)
   Press to adjust color hues.

6. **Memory Preset Buttons:**

   CUST1
   Press to recall settings for the current input from the “Custom 1” memory preset.

   ISF NIGHT
   Press to recall settings for the current input from the “ISF Night” memory preset.

   ISF DAY
   Press to recall settings for the current input from the “ISF Day” memory preset.

   CUST2
   Press to recall settings for the current input from the “Custom 2” memory preset.

7. **Aspect Ratio Selection Buttons**
   Use these buttons to select an aspect ratio directly, as follows:

   16:9
   For viewing 16:9 DVDs or HDTV programs in their native aspect ratio.

   4:3
   Scales the input signal to fit 4:3 display mode in the center of the screen.

   LBOX (Letterbox)
   For viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.

   VWIDE (VirtualWide)
   Enlarges a 4:3 image horizontally in a NON-linear fashion to fit 16:9 full screen display.

   CINEMA
   For viewing 2.35:1 source material.

   VCINE (Virtual Cinema – CineWide-equipped projectors only)
   Selects the Virtual Cinema aspect ratio, used for viewing 16:9 source material on a 2.35:1 screen.

8. **0 - 9**
   Use these keys to enter numeric characters.

9. **Motorized Lens Controls:**

   FOCUS
   To focus the image, press **FOCUS**. Then, press and hold the **UP** or **DOWN** button. When finished, press **MENU** or **EXIT**.

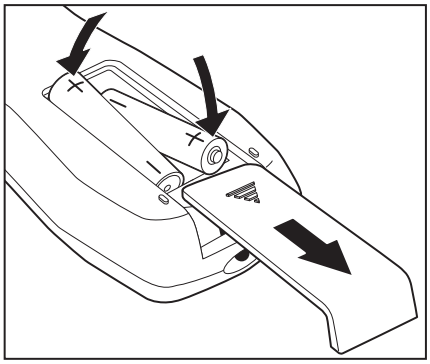
   ZOOM
   To adjust the projected image size, press **ZOOM**. Then, press and hold the **UP** button to zoom in (enlarge) or the **DOWN** button to zoom out (reduce). When finished, press **MENU** or **EXIT**.

   LENS (Lens Shift)
   To adjust the lens position, press **LENS.** Then, press and hold the **RIGHT, LEFT, UP** or **DOWN** button. When finished, press **MENU** or **EXIT**.

3. Installation

3.1 Remote Control

To install batteries in the remote control, press up on the battery cover retainer clip and lift off the cover. Install the two AAA batteries with the correct polarity and then replace the cover.



◄ ***Notes on Batteries***

- Make sure that the battery polarities are correct when installing the batteries.
- Do not mix an old battery with a new one or different types of batteries.
- If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.

◄ ***Notes on Remote Control Operation***

- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the projector.
- If the effective range of the remote control decreases, or it stops working, replace the batteries with new ones.
- The remote control may fail to operate if the infrared remote sensor is exposed to bright sunlight or fluorescent lighting.
- Ambient conditions may possibly impede the operation of the remote control. If this happens, point the remote control at the projector, and repeat the operation.

3.2 Quick Setup

Table 3-1 gives a quick overview of the VX-22d installation process. The sections following this one provide detailed instructions.

Note *Installation should be performed by a qualified custom video installation specialist.*

Table 3-1. Installation Overview

Step	Procedure	For Details, Refer to page...
1	Choose a location for the projector	17
2	Install the primary projection lens	22
3	**If installing an VX-22d/CineWide with AutoScope:** Install AutoScope lens motor	24
4	Mount the projector	27
5	Connect the DHD Controller to the projector	28
6	Connect signal sources to the DHD Controller	29
7	Connect external controller to RS-232 port (optional)	34
8	Connect 12-volt trigger outputs to AutoScope lens motor and/or other equipment (optional)	35
9	Connect projector, DHD Controller and lens motor (if present) to AC power and power up	37
10	For rear-screen and/or ceiling-mount installations, select the proper picture orientation	37
11	Primary lens adjustments: projected image size (zoom), position (shift) and focus	19, 38
12	Install CineWide anamorphic lens (optional)	39
13	CineWide lens adjustments: position, pitch (angle), geometry and focus	41
14	Projector calibration: adjust the following ***for each input***; save settings when finished: • Aspect ratio • Brightness • Contrast • Color level • Tint • Input position	47 through 54

3.3 Installation Considerations

Proper installation of your projector will ensure the quality of your display. Whether you are installing a projector temporarily or permanently, you should take the following into account to ensure your projector performs optimally.

◄ ***Installation Type***

Choose the installation type that best suits your needs: front or rear screen, floor mount or inverted mount. Table 3-2 compares these various installation methods.

Table 3-2. Projector Installation Options

Advantages	Considerations
Front Screen, Floor Mount Installation	
• Easy to set up • Can be moved or changed quickly • Easy to access	• Shares floor space with audience
Front Screen, Inverted Mount (ceiling) Installation	
• Does not take up audience space • Projector is unobtrusive • Projector cannot be accidentally moved	• Installation is more permanent • Projector access is more difficult
Rear Screen, Floor Mount Installation	
• Projector is completely hidden • Projector is easily accessed • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher
Rear Screen, Inverted Mount (ceiling) Installation	
• Projector is completely hidden • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher
Rear Screen, Floor Mount with Mirror	
• Projector is completely hidden • Usually good ambient light rejection • Requires less space behind screen than other rear screen installations	• Requires separate room • Installation cost is usually higher

◄ ***Ambient Light***

In general, minimize or eliminate light sources directed at the screen. Contrast ratio in your images will be noticeably reduced if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

Throw Distance ➤

Throw distance is the distance measured from the front of the projector to the screen. This is an important calculation in any projector installation as it determines whether or not you have enough room to install your projector with a desired screen size and if your image will be the right size for your screen.

You can quickly estimate the throw distance by taking the width of the screen and multiplying it by the lens throw ratio; see Figure 3-1. The result of this calculation tells you roughly how far back the projector should be positioned from the screen in order to project a focused image large enough to fill the screen.

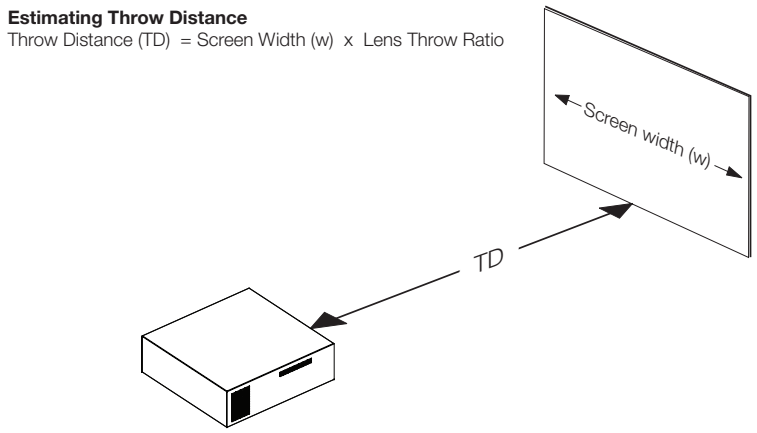


Figure 3-1. Estimating Throw Distance

Table 3-3 lists the available lens options for the VX-22d and their associated throw ratios.

Table 3-3. VX-22d Lens Options and Throw Ratios

Lens Option (Note 2)	Throw Ratio with Primary Lens Only	Throw Range in inches, with 96x54-inch (1.78:1) Screen		Throw Ratio with Primary Lens and Anamorphic Lens	Throw Range in inches, with 126.9x54-inch (2.35:1) Screen	
		Minimum	Maximum		Minimum	Maximum
Triton A1	0.70 Fixed	67.20		Not Applicable (Note 2)		
Triton A2	1.155 Fixed	110.88				
Triton B	1.40 - 1.81	134.40	173.76			
Triton C	1.85 - 2.53	177.60	242.88	1.40 - 1.90	177.66	241.11
Triton D	2.57 - 4.20	246.72	403.20	1.90 - 3.15	241.11	399.73
Triton E	4.30 - 7.00	412.80	672.00	3.14 - 5.50	398.47	697.95

Notes:

1. Throw distance does not affect image quality, provided these ranges are taken into account.

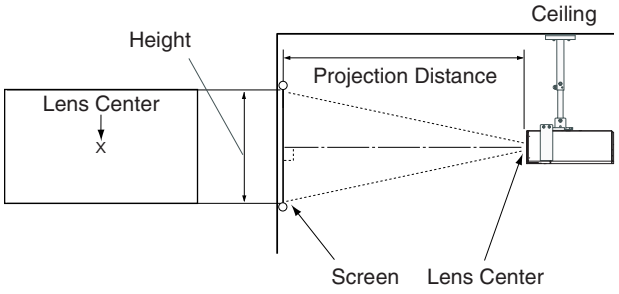
2. Only the Triton C, D and E lenses can be used with the optional CineWide (secondary anamorphic) lens. Doing so affects the throw distances as shown here.

◄ *Vertical and Horizontal Position*

Proper placement of the projector relative to the screen will yield a rectangular, perfectly-centered image that completely fills the screen.

Ideally, the projector should be positioned perpendicular to the screen and in such a way that the lens center and screen center are aligned with each other, as shown in Figure 3-2.

Ceiling Installation



Floor Installation

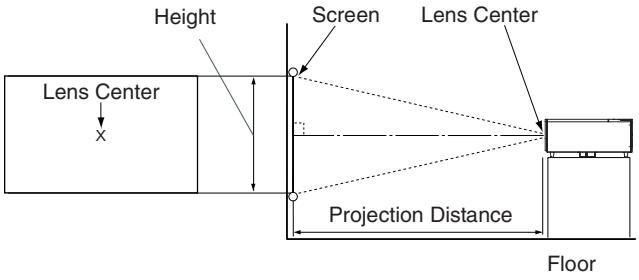
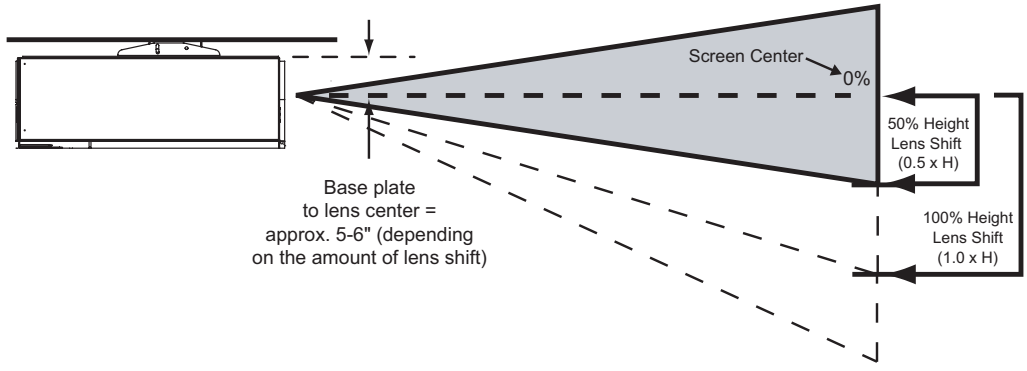


Figure 3-2. Projector Placement

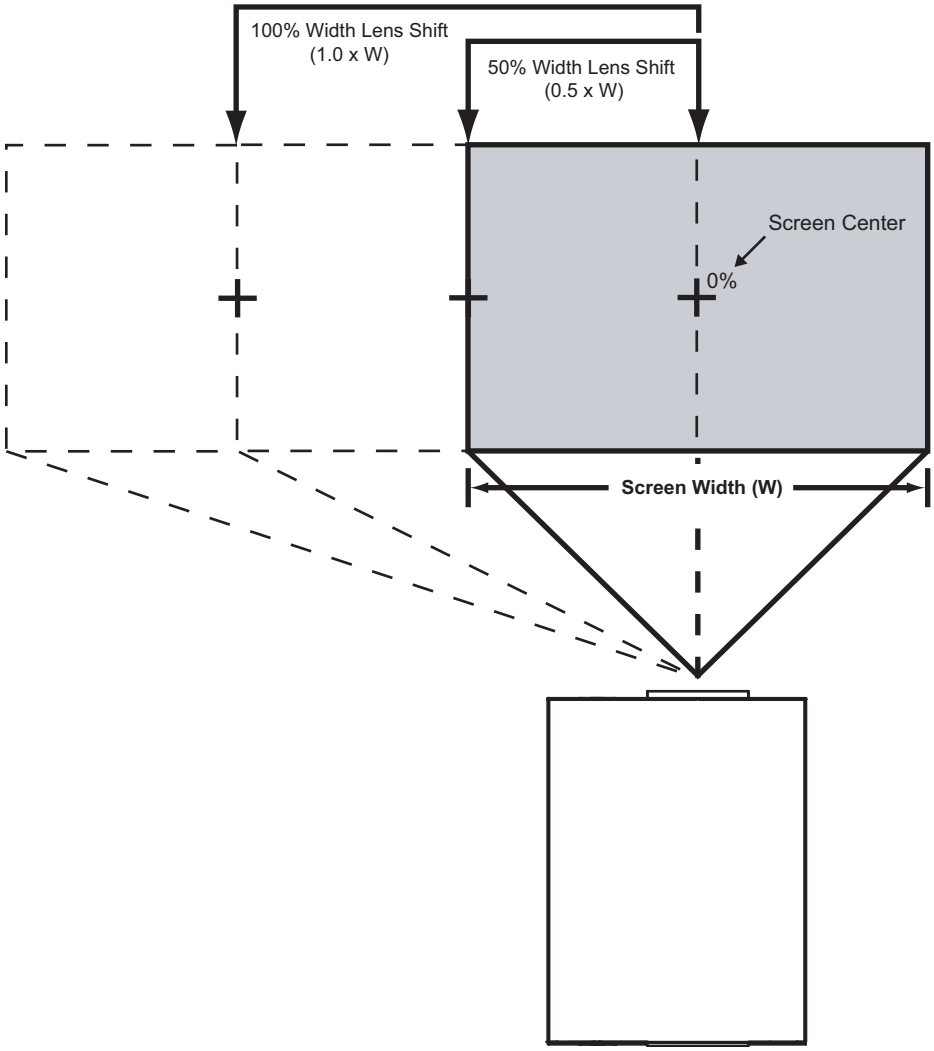
◄ *Vertical and Horizontal Lens Shift*

If it is not possible to align the projector and screen as shown in Figure 3-2, you can use the lens shift controls to center the image on the screen. Lens shift is generally expressed as a percentage of the screen height or width, as shown in Figure 3-3 and Figure 3-4.



Note: *This is a general example of lens shift. Lenses vary in their shift capabilities.* ***No particular lens or projector is used in this example.***

Figure 3-3. Vertical Lens Shift (EXAMPLE ONLY)



Note: *This is a general example of lens shift. Lenses vary in their shift capabilities.* ***No particular lens or projector is used in this example.***

Figure 3-4. Horizontal Lens Shift (EXAMPLE ONLY)

Table 3-4 lists the lens shift limits for each available VX-22d lens, as percentages and absolute measurements with a 100 x 56 inch (1.78:1) screen.

Table 3-4. VX-22d Vertical and Horizontal Lens Shift Limits

		Lens Option					
		Triton A1	**Triton A2**	**Triton B**	**Triton C**	**Triton D**	**Triton E**
Lens Shift Limits, as Percentages of Screen Height or Width (Notes 1 and 2)							
Vertical (Note 2)	Up	10%	31%	30%	32%	28%	30%
	Down	10%	71%	61%	62%	65%	63%
Horizontal (Note 2)	Left	5%	17%	12%			
	Right	5%	17%	12%			
Lens Shift Limits in Inches, with a 100-by-56 inch (1.78:1) Screen							
Vertical	Up	5.60	17.36	16.80	17.92	15.68	16.80
	Down	5.60	39.76	34.16	34.72	36.40	35.28
Horizontal	Left	5.00	17.00	12.00			
	Right	5.00	17.00	12.00			

Notes:

1. *With no vertical or horizontal lens shift, the lens center and screen center are aligned with each other.*
2. *Vertical shift limits are percentages of the screen height. Horizontal shift limits are percentages of the screen width.*
3. ***Vertical lens shift figures apply to ceiling mount configurations.*** *For floor installations (where the projector is upright), reverse the up/down vertical offset percentages.*

◄ ***Folded Optics***

In rear screen applications where space behind the projector is limited, a mirror may be used to fold the optical path, as shown in Figure 3-5. The position of the projector and mirror must be accurately set. If you are considering this type of installation, contact your dealer for assistance.

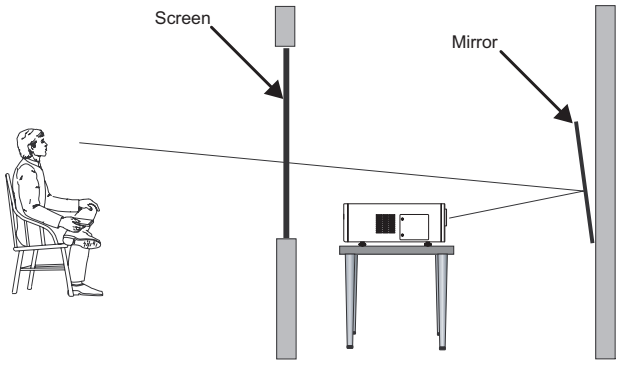


Figure 3-5. Folded Optics

Other Considerations ➤

Other considerations and tips that can help improve your installation:

- Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry, which may affect performance.
- Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers and elevators.

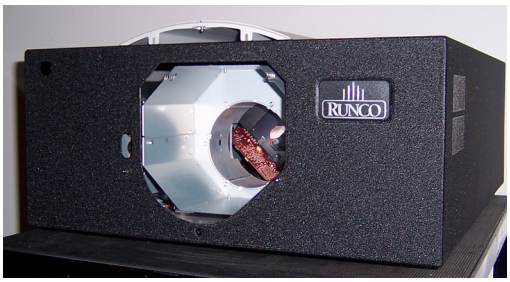
3.4 Installing the Primary Projection Lens

The projection lens is shipped separately from the projector. To install it, proceed as follows:

1. Loosen the captive Phillips screw at the top of the Projector Front Jewelry.

2. Remove the jewelry.

3. Remove the Lens Cavity Front Cover.



4. Remove the Rear Lens Cap.

5. Hold the lens assembly with the motor facing the upper-right corner of the Lens Cavity. **Carefully** insert the back of the lens assembly into the hole in the lens flange.

   DO NOT PUSH THE LENS ASSEMBLY ALL THE WAY IN. Only push the lens assembly in far enough so that the front of the lens motor is clearly behind the projector chassis cover.

6. Carefully rotate the lens assembly 45 degrees clockwise until the motor socket connector is aligned with the connector on the flange. Then, gently push the lens assembly in until it is seated flush against the flange and the connectors have seated.

Caution *Make sure to route the wire harness in its original position and away from the moving lens stages and Motor Assembly, to prevent unexpected disconnection or lens damage.*

7. Lock the lens in place by turning the Lens Locking Nut (to the left of the lens) 180 degrees counter-clockwise. (Use a 6.0mm hex wrench.)

8. Replace the Lens Cavity Front Cover.
9. Reattach the Projector Front Jewelry by sliding the top down onto the two retaining dowels. Tighten the Phillips screw at the top of the projector to secure it.
10. Remove the Front Lens Cap.

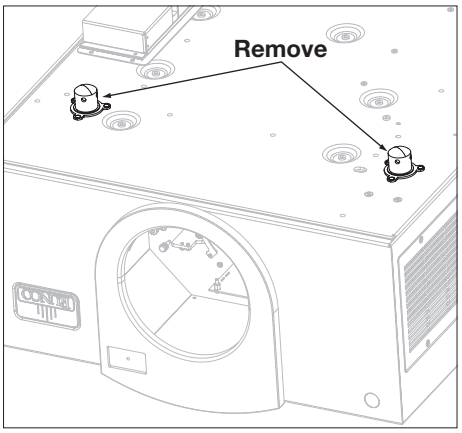
3.5 Installing the Optional CineWide/AutoScope Lens Motor

If you are installing a VX-22d with the optional CineWide with AutoScope system, proceed as follows to install the AutoScope lens motor.

Note

1. *Do not install the CineWide lens yet, only the lens motor. You will install the CineWide lens after you install the projector and adjust the primary lens.*
2. *Some components shipped with your projector may differ slightly from what is shown in these instructions.*
3. *The anamorphic lens mounting kit is partially pre-assembled at the factory – the AutoScope lens motor and lens mounting assemblies are both fully assembled.*

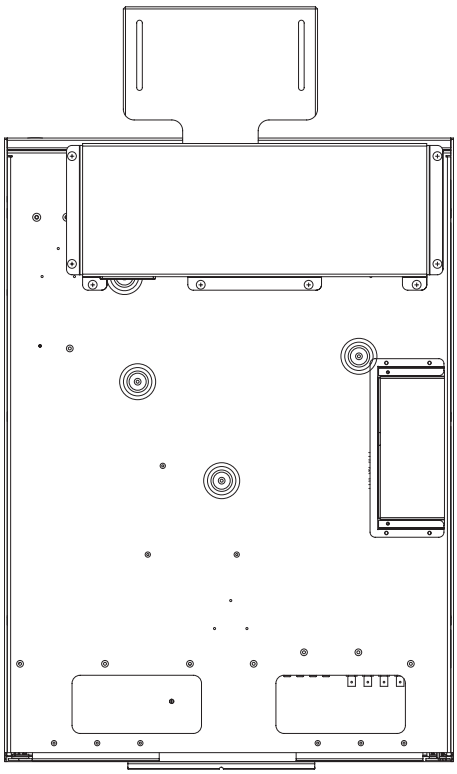
Remove Projector Front Feet ➤ Place the projector upside down on a blanket or other soft surface. Loosen and remove the two front feet on the projector.



➤ *Install AutoScope Lens Motor*

Line up the eight mounting holes on the lens motor housing with those on the bottom of the projector.

Secure the motor to the projector with the eight screws provided for this purpose.



Install Ceiling Mount Extension Brackets ➤

If you are installing a VX-22d/CineWide with AutoScope, use the supplied hardware to attach the ceiling mount extension brackets to the bottom of the projector as shown in Figure 3-6.

For ceiling installations, these brackets bring the mounting points for the projector mounting plate (included with the ceiling mount kit) from the bottom of the projector up and around the lens motor housing. For floor installations (where the projector is upright), the brackets allow the projector to lie flat on the mounting surface.

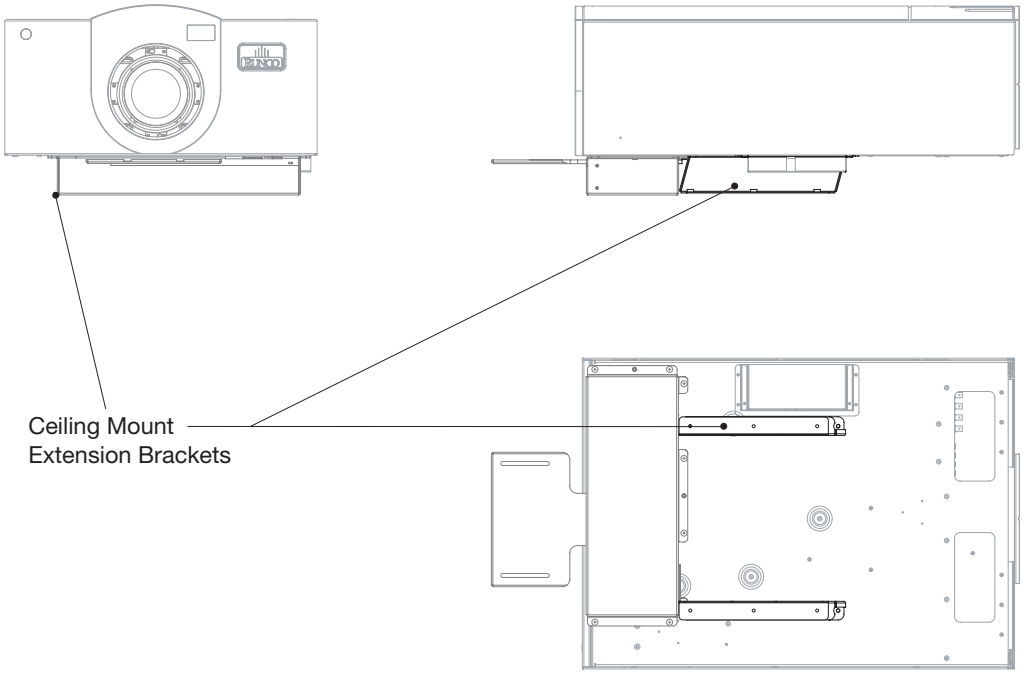


Figure 3-6. VX-22d With Ceiling Mount Extension Brackets

3.6 Mounting the VX-22d

There are several methods for mounting the projector. Depending on your chosen installation, one method may be more suitable than another.

➤ Floor Mounting (Upright)

In typical front and rear screen installations, the projector can be mounted to a secure and level surface such as a table or cart. Carts are useful when moving a projector during a presentation or from site to site. If possible, lock the wheels when it's in position to prevent it from being moved during a presentation.

➤ Ceiling Mounting (Inverted)

For fixed installations, and for those that want the projector out of sight or have a limited space for projector and audience, you can invert the VX-22d and suspend it from the ceiling using a specially-designed ceiling mount fixture.

Note *Use only the Runco-approved ceiling mount kit designed for your projector. Install the mount kit according to the instructions provided with it.*

The projector can also be inverted and placed in an enclosure above and behind the viewing area. Install four feet on the inside bottom surface of the enclosure on which the projector can rest. A variety of materials can be used for this purpose (for example, rubber crutch tips or turntable feet).

➤ Adjusting the Projection Angle

If the VX-22d is ceiling-mounted and the screen is significantly lower than the projector, you can tilt the projector at a slight angle by adjusting the ceiling mount.

If you do this, you may need to shift the image using the on-screen display (OSD) controls, to compensate. For detailed instructions, refer to ***Using the On-Screen Menus*** on page 45.

Note *Use only the Runco-approved ceiling mount kit designed for your projector.*

3.7 Connections to the VX-22d and DHD Controller

Proceed as follows to connect the DHD Controller to the VX-22d, your video sources, external controller(s) – if present – and AC power.

When connecting your equipment:

- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.

Connector Panel Access ➤

To access the connector panel, pull firmly on the cable access cover to open it.

Connecting the DHD Controller to the VX-22d ➤

The VX-22d is designed to receive only digital input signals directly from the companion DHD Controller/Processor. All signal sources should be connected to the appropriate inputs on the rear panel of the controller. The signal from the controller is then output to the VX-22d projector through a DVI-DL (dual-link) cable.

Note

You CANNOT connect a signal source with DVI output directly to the VX-22d. It MUST be routed through the DHD Controller for proper operation.

Use a Runco DVI Dual-Link (DVI-DL) cable to connect the output of the DHD Controller to the input of the VX-22d; see Figure 3-7.

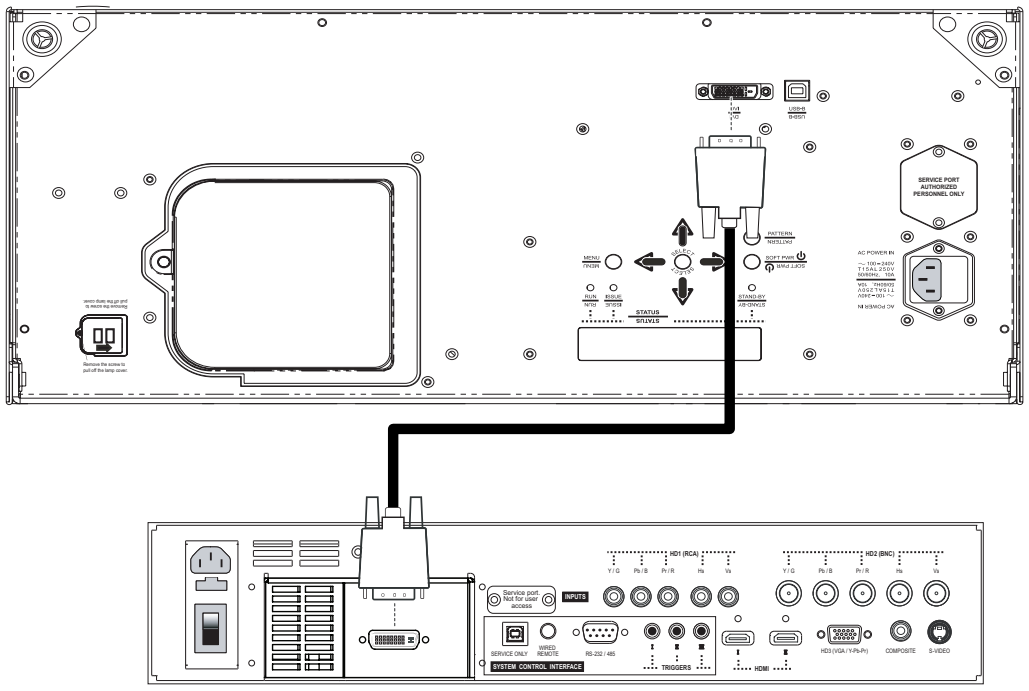


Figure 3-7. Connecting the VX-22d to the DHD Controller

➤ *Connecting Source Components to the DHD Controller*

Connect your video sources to the DHD Controller as shown and described in the sections that follow.

HDMI Connections: See Figure 3-8.

Tip

Use the HDMI inputs whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the projector.

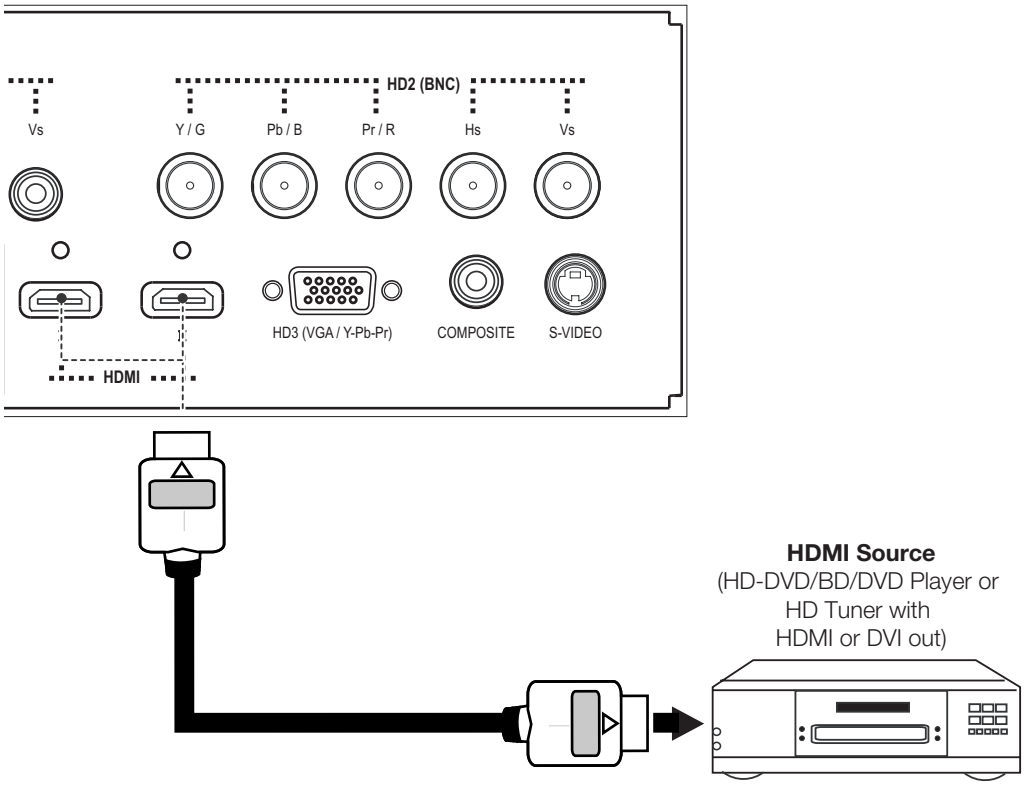


Figure 3-8. HDMI Source Connections

Digital (DTV) RGB or Component Video Connections: See Figure 3-9 and Figure 3-10.

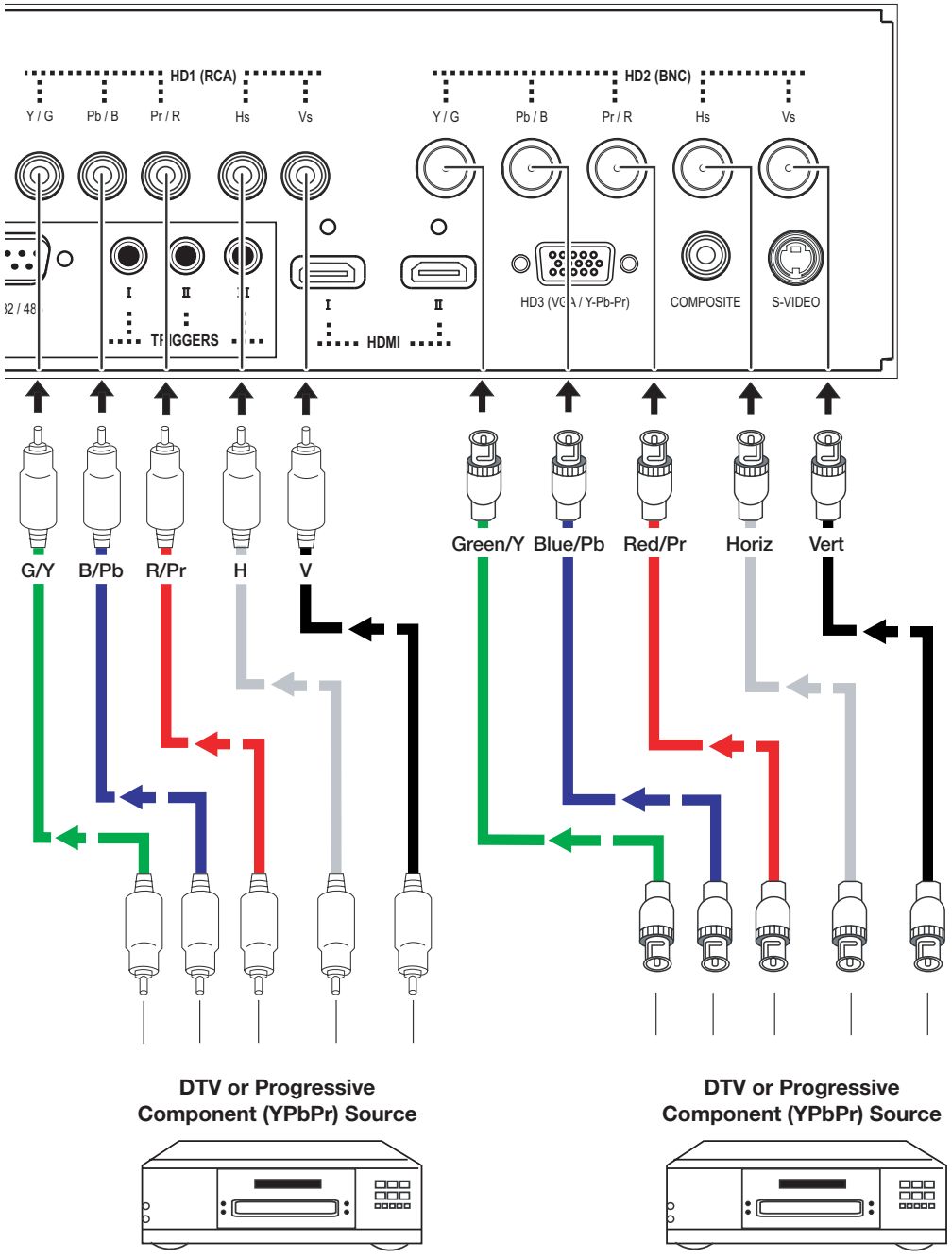


Figure 3-9. Digital (DTV) RGB or Component Video Connections (HD1, HD2)

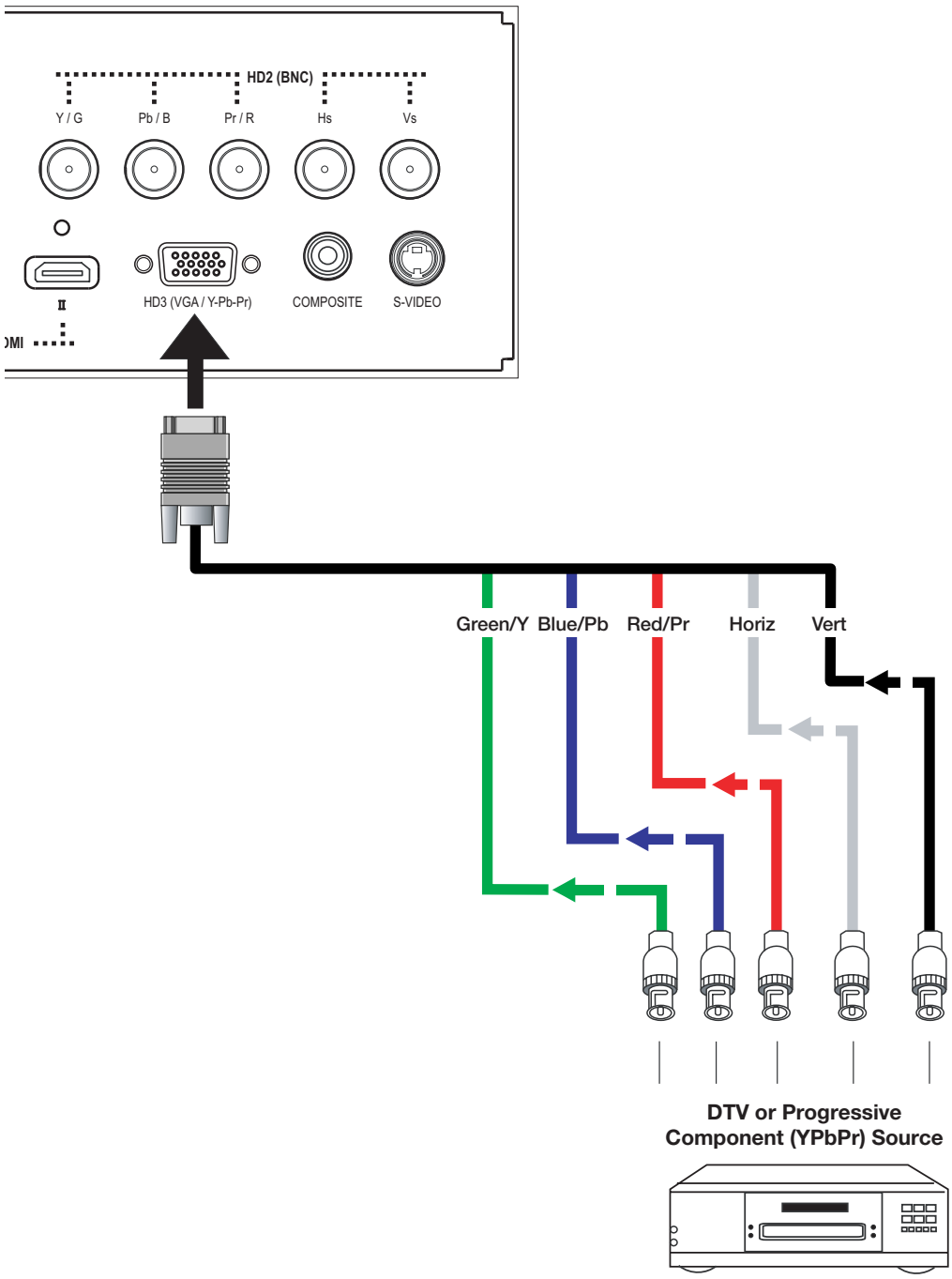


Figure 3-10. Digital (DTV) RGB or Component Video Connections (HD3)

Analog (Computer) RGB Connections: See Figure 3-11.

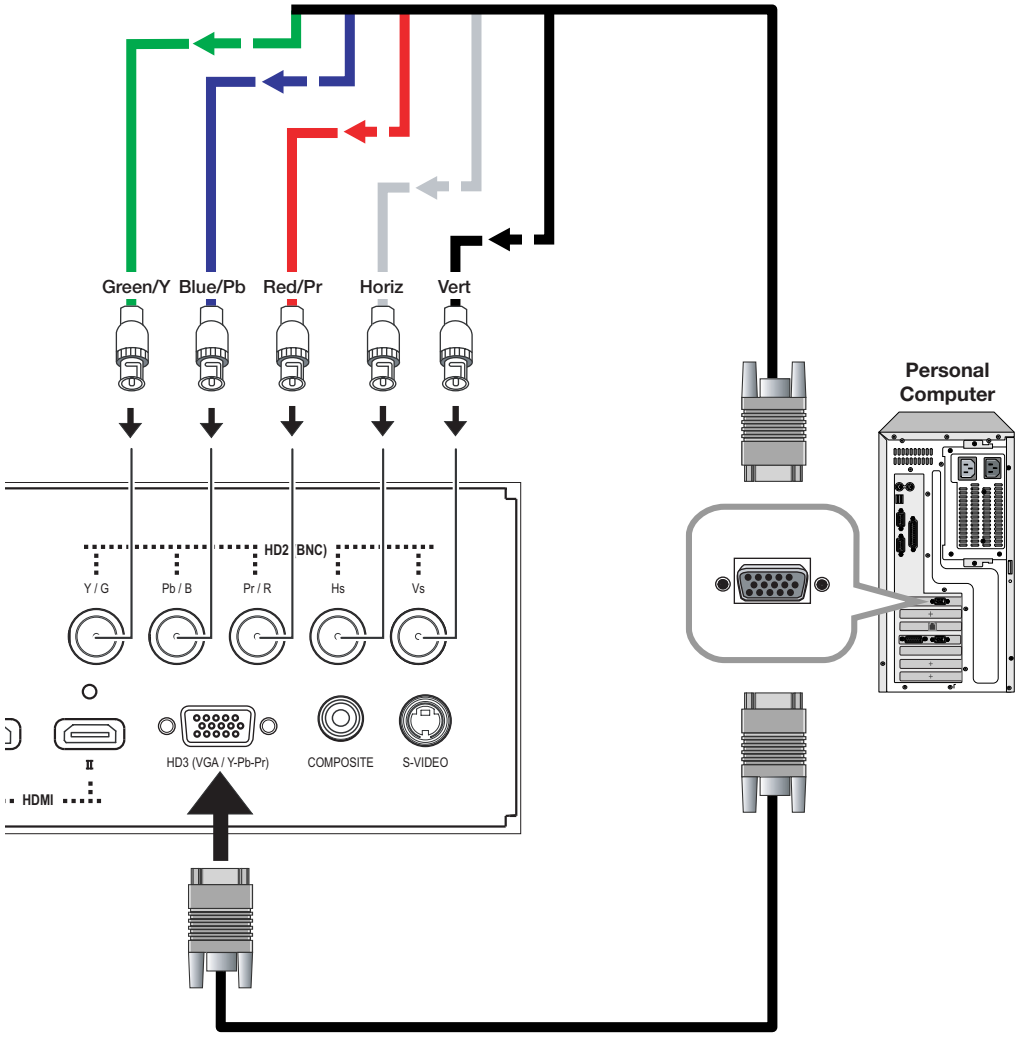


Figure 3-11. Analog RGB Connections

S-Video/Composite Video Connections: See Figure 3-12.

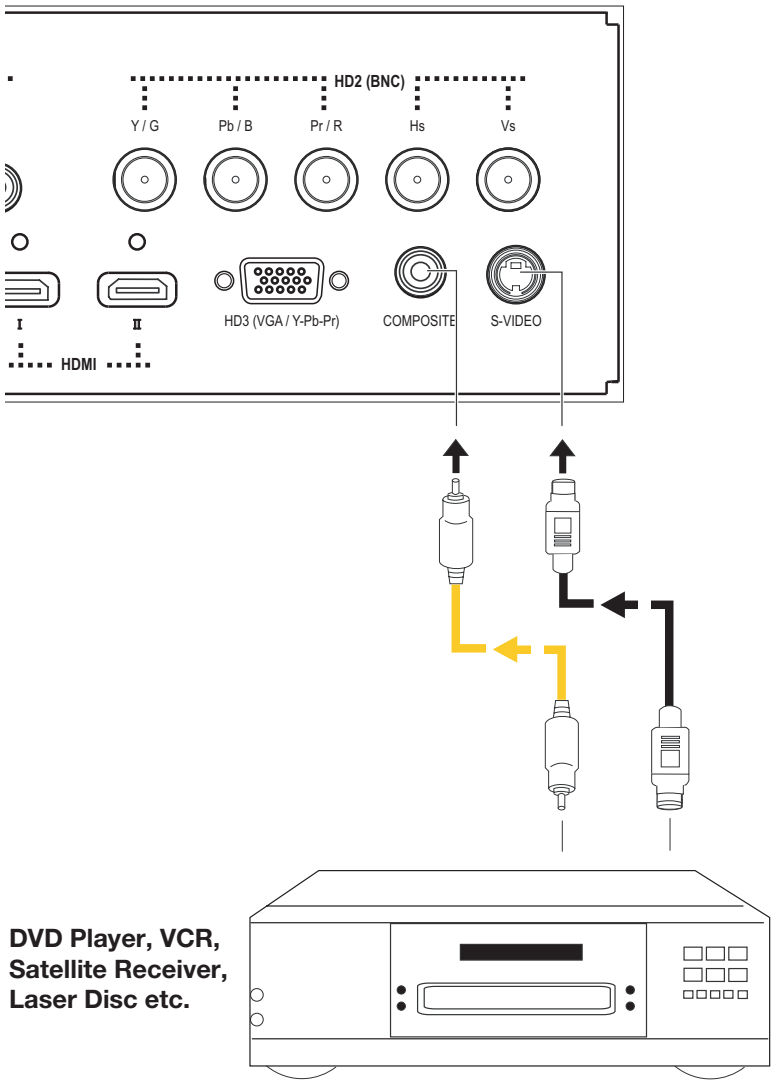


Figure 3-12. S-Video and Composite Video Connections

RS-232 Controller Connection ➤

Use a “null-modem” 9-pin RS-232 cable to connect a PC or home theater control/automation system (if present) to the RS-232/485 port on the DHD Controller; see Figure 3-13.

For more information about using this connection, refer to ***Serial Communications*** on page 63.

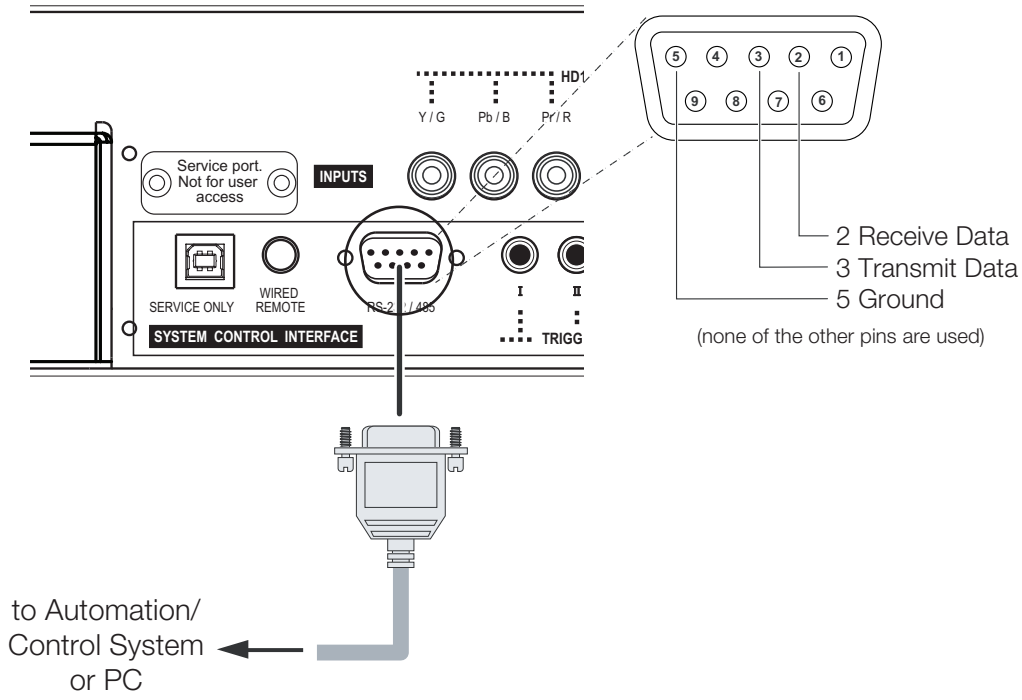


Figure 3-13. RS-232 Control System Connection

➤ *Connecting 12-Volt Trigger Outputs to External Theater Equipment*

If your VX-22d is equipped with a CineWide with AutoScope system, connect the AutoScope lens motor to a 12-volt trigger output on the DHD Controller; see Figure 3-14.

Similarly connect other 12-volt trigger-activated equipment (such as retractable screens or screen masks) to the other trigger outputs.

For more information on using the DHD Controller triggers, refer to ***Triggers*** on page 63.

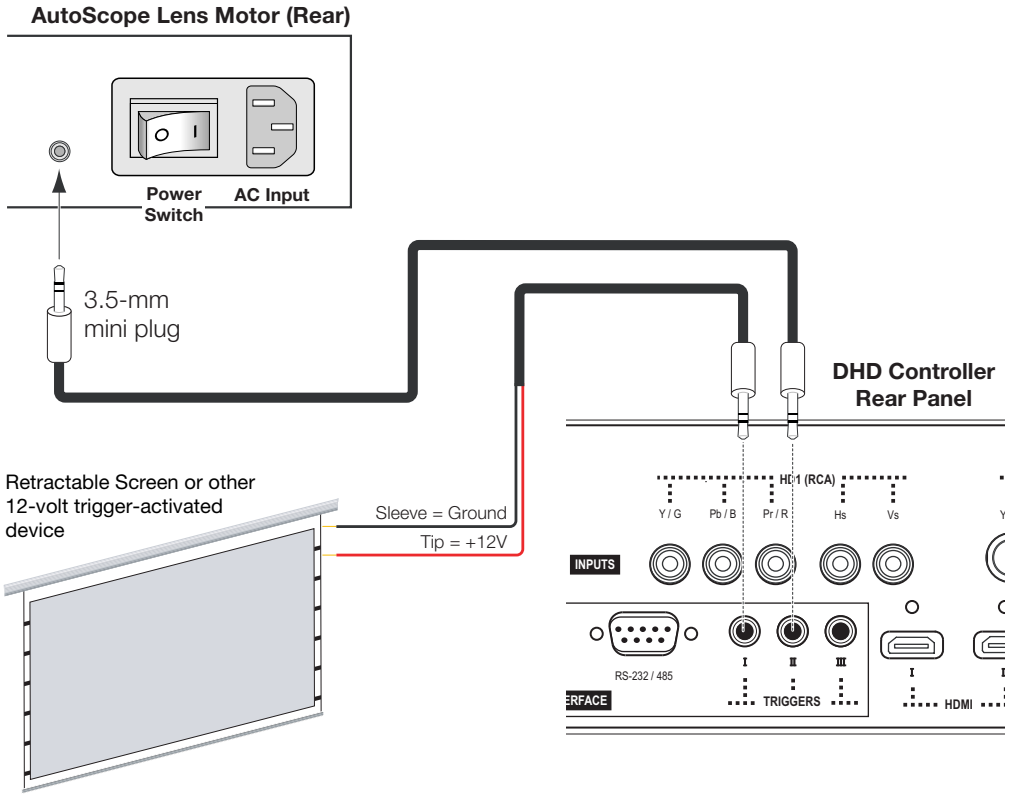


Figure 3-14. 12-volt Trigger Output Connections

Connecting an External IR Receiver to the DHD Controller

If infrared signals from the remote control cannot reach the DHD Controller due to excessive distance or obstructions such as walls or cabinet doors, you can connect an external IR receiver to the WIRED REMOTE input on the DHD Controller to extend the range of the remote control. See Figure 3-15.

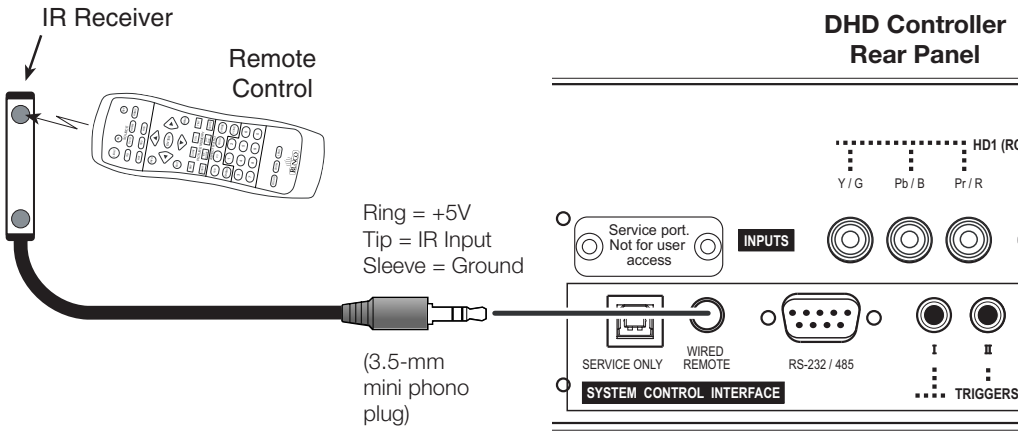


Figure 3-15. External IR Receiver Connection

Note

When an external IR receiver is connected to the wired IR input, the built-in IR sensor on the DHD Controller is disabled.

Projector/DHD Controller: Plug the female end of one power cord into the AC receptacle on the rear of the VX-22d (AC 100V ~ 240V). Then, connect the other end to your AC power source.

Similarly connect the DHD Controller to a nearby AC outlet.

AutoScope Lens Motor: With AutoScope-equipped projectors, an additional power cord is provided for the lens motor. Plug the female end of the AC power cord into the AC input on the rear of the lens motor assembly. Connect the other end to a 110 VAC power source.

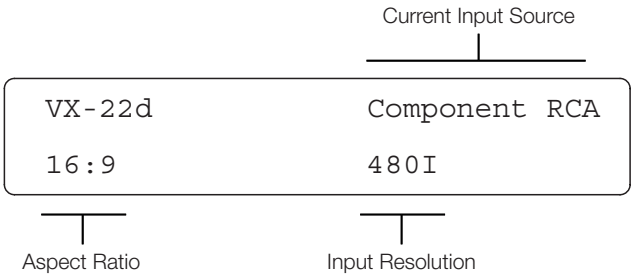
➤ ***Connecting to AC Power***

Caution

The input voltage to the AutoScope lens motor must be between 100 and 120 VAC. ***Do not connect the AutoScope lens motor to a 200-240 VAC power source!***

3.8 Turning on the Power

1. Turn on your source components.
2. Turn on the main power switch at the rear of the projector.
3. Turn on the main power switch at the rear of the DHD Controller.
4. Press the **ON** button on the remote control – or the **SOFT PWR** button on the DHD Controller front panel – to turn on the system. The vacuum fluorescent display on the DHD Controller front panel briefly displays “Starting Display.”
5. When the projector is ready for use (after about 20 seconds), the **RUN** LED on the DHD Controller front panel lights solid blue. The fluorescent display indicates the current input source, aspect ratio and input resolution; for example:



3.9 Adjusting the Picture Orientation

By default, the VX-22d is configured for a “floor/front” installation, in which the projector is installed upright and in front of the screen. If it is installed behind the screen and/or inverted, you must change the picture orientation. To do this:

1. Press **MENU**.
2. Select Service from the Main Menu and enter the Service Menu passcode.
3. Select Display Device from the Service Menu.
4. Select Installation from the Display Device menu.
5. Choose Floor Rear, Ceiling Front or Ceiling Rear, to match the installation method.

Note

You must enter a passcode to access the Service menu.

3.10 Primary Lens Adjustments

To access the motorized lens controls, use the FOCUS, ZOOM and LENS buttons on the VX-22d remote control unit (described on page 14).

Alternatively, select Display Device from the Service Menu. Select Configure, then Lens from the Display Device menu. The Lens menu gives you a great deal of control over the picture size, position and focus:

Focus ➤ To focus the projected image, use the cursor buttons to highlight “In” or “Out.” Then, press and hold the **ENTER** button on the remote control.

Zoom ➤ To make the picture smaller (zoom out), use the cursor buttons to highlight the minus sign (-). Then, press and hold the **ENTER** button on the remote control.

To enlarge the picture (zoom in), use the cursor buttons to highlight the plus sign (+). Then, press and hold the **ENTER** button on the remote control.

Vertical and Horizontal Lens Shift ➤ To change the projected image position, use the cursor buttons to highlight “Left,” “Right,” “Up” or “Down” in the Lens menu. Then, press and hold the **ENTER** button to shift the image in that direction.

3.11 Installing and Adjusting the CineWide Anamorphic Lens

If you are installing a CineWide-equipped projector, proceed as follows to install and adjust the anamorphic lens.

Note

It is extremely important that the primary lens is properly adjusted before you install the anamorphic lens. Ensure that the image from the primary lens is perfectly centered on the screen.

The VX-22d Anamorphic lens mount kit consists of everything shown in Figure 3-16. Some components shipped with your projector may differ slightly from what is shown in these instructions. If any items are missing or damaged, please contact your Runco dealer or Runco Customer Service at (800) 23-RUNCO.

➤ ***Attach Lens Mounting Assembly to Lens Motor Carriage Plate***

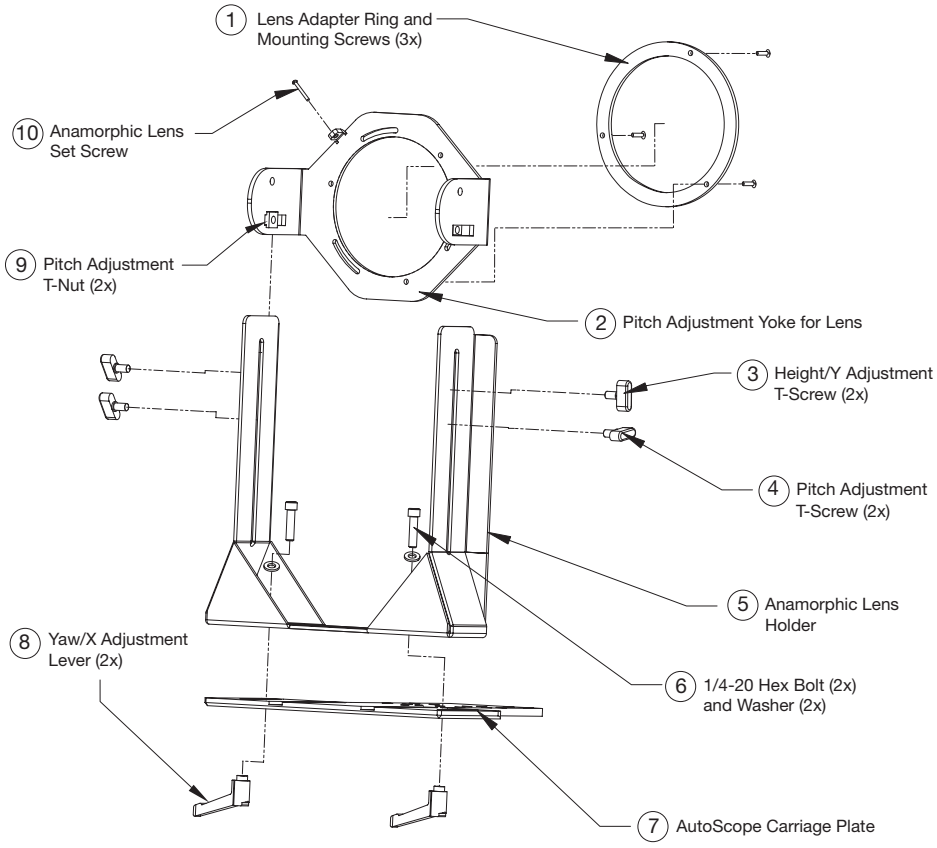

1 Lens Adapter Ring and Mounting Screws (3x)
10 Anamorphic Lens Set Screw
9 Pitch Adjustment T-Nut (2x)
2 Pitch Adjustment Yoke for Lens
3 Height/Y Adjustment T-Screw (2x)
4 Pitch Adjustment T-Screw (2x)
5 Anamorphic Lens Holder
8 Yaw/X Adjustment Lever (2x)
6 1/4-20 Hex Bolt (2x) and Washer (2x)
7 AutoScope Carriage Plate

Figure 3-16. VX-22d Anamorphic Lens Mounting Assembly - Exploded View

1. Remove the two Yaw/X Adjustment Levers (item #8) from the bottom of the Anamorphic Lens Holder (item #5).
2. Place the Anamorphic Lens Holder on top of the AutoScope Carriage Plate (item #7). Position the bracket so that the long slot at the bottom of the lens holder is perpendicular to the corresponding slots on the carriage plate.
3. Secure the Anamorphic Lens Holder to the plate using the Hex Bolts/Washers (item #6) and Yaw/X Adjustment Levers that you removed in Step 1.

4. Use the Lens Mounting Screws to attach the Lens Adapter Ring (item #1) to the Pitch Adjustment Yoke (item #2); see Figure 3-17. (Use the round, threaded holes on the yoke.)
5. Use the Height/Y Adjustment T-Screws (item #3), Pitch Adjustment T-Screws (item #4) and T-Nuts (item #9) to attach the Pitch Adjustment Yoke and Lens Adapter Ring to the Anamorphic Lens Holder. **The Yoke should be as close to the primary lens as possible.**
6. Attach the lens to the Lens Adapter Ring by threading it clockwise.

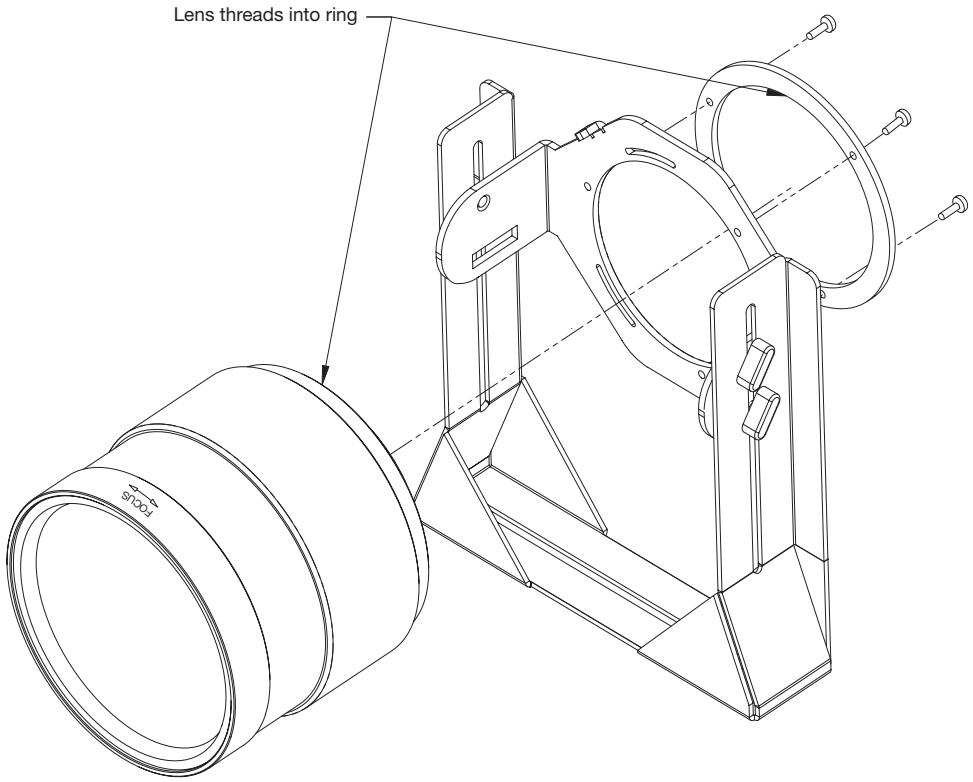


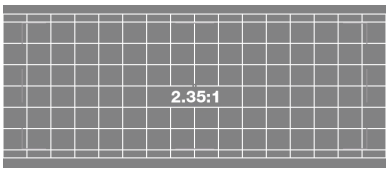
Figure 3-17. Attaching the Anamorphic Lens to the Lens Adapter Ring

◄ *Configure Lens Motor Trigger*

CineWide with AutoScope maintains constant image height independent of the aspect ratio, while using the full display resolution of the projector. It accomplishes this by moving the anamorphic lens in front of the primary lens when widescreen material is being viewed. When the viewer transitions back to 16:9 or 4:3 source material, the anamorphic lens moves out of the light path.

To configure the lens motor trigger on the DHD Controller for proper AutoScope operation:

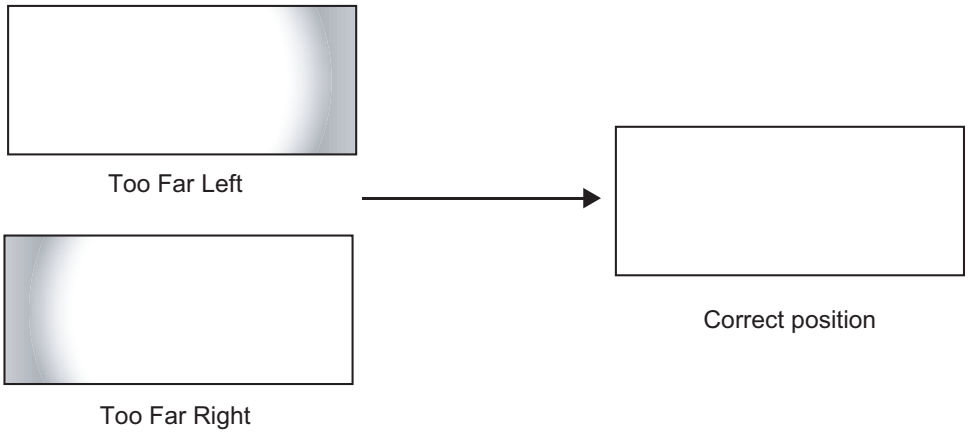
1. Project a 2.35:1 aspect ratio test pattern or other image on the screen.
2. Press **MENU** on the remote control and enter the Service menu passcode.
3. Select **Service** from the Main menu.
4. Select **Triggers** from the Service menu.
5. Assign the trigger output to which the lens motor is connected to the Cinema and Virtual Cinema aspect ratios. This enables the lens motor to move the anamorphic lens into position (in front of the primary lens) when either aspect ratio is selected.
6. To save the trigger settings, press ▼ repeatedly to highlight “Save.” Then, press **ENTER**.
7. Select the Cinema aspect ratio to move the anamorphic lens into position, if it isn’t already. To do this, press **CINEMA** on the DHD Controller remote control (Figure 2-5), or press ▲ or ▼ repeatedly with no menus visible on-screen.



◄ *Adjust the Anamorphic Lens*

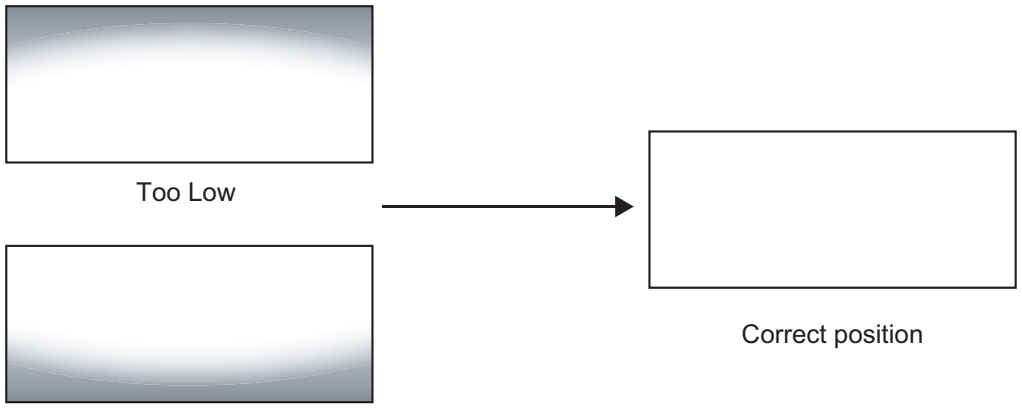
Adjusting the Horizontal (X) Lens Position:

1. Project a white field on the screen.
2. Loosen the Yaw/X-Adjustment Levers underneath the lens.
3. Slowly move the anamorphic lens into place so that there are no shadows on either side of the screen:



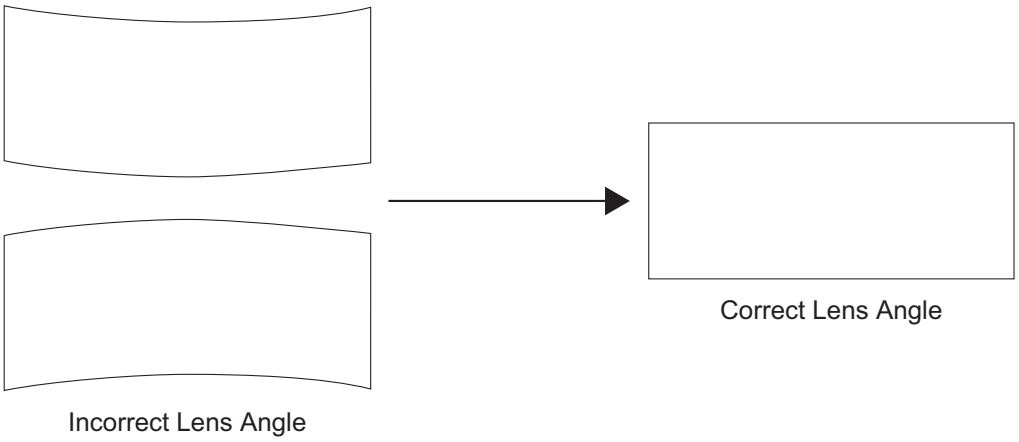
4. When the horizontal position is properly set, tighten the Yaw/X-Adjustment Levers to secure the lens in place.

Adjusting the Height (Y): With the white field still on-screen, loosen the Height/Y Adjustment T-Screws on either side of the lens. Then, slowly move the anamorphic lens into place so that there are no shadows on the top or bottom of the screen:



When the height is properly set, tighten the Height Adjustment T-Screws to secure the lens in place.

Pitch (Angle): Next, angle the lens to even out any top-to-bottom pincushion distortion. To do this, loosen the Pitch Adjustment T-Screws (directly below the Height/Y Adjustment T-Screws) on either side of the lens to allow it to pivot freely. Then, adjust the anamorphic lens angle so that the projected image is rectangular:



The anamorphic lens will almost always be angled with respect to the projector; this is normal.

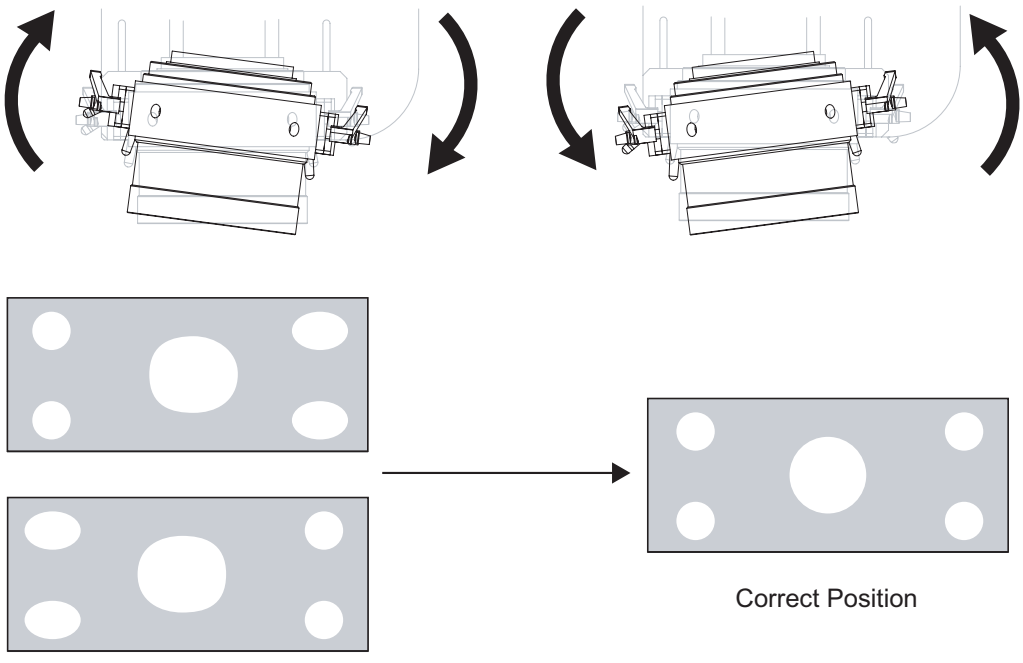
Once the proper lens angle has been set, firmly tighten the Pitch Adjustment Levers to secure the lens in place.

Note

There may be some pincushion distortion even after the lens is properly adjusted, especially at shorter throw distances. If this is the case, Runco recommends that you slightly over-scan the image into the screen frame area to mask the distortion.

Adjusting the Yaw: Loosen the Yaw/X-Adjustment Levers to allow the lens to pivot freely from side to side. Then, angle the lens to even out any left-right pincushion distortion:

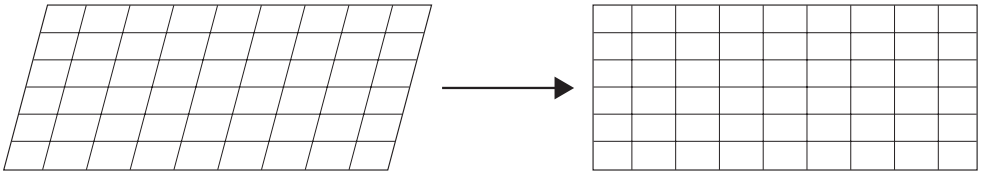
Anamorphic Lens (Top View)



Once the proper lens angle has been set, firmly tighten the Yaw/X-Adjustment Levers to secure the lens in place.

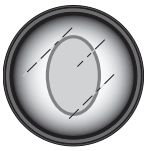
Adjusting the Geometry:

1. Input an anamorphic cross-hatch test pattern to the projector.
2. Unscrew the Anamorphic Lens just enough to allow it to rotate freely.
3. Grasp the lens by the center ring and rotate the lens until the image is properly anamorphic:

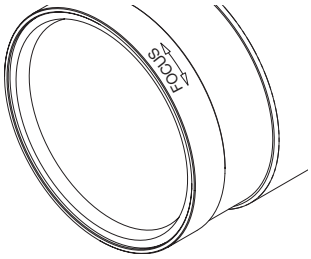


Wrong Position Correct Position

4. When the image geometry appears correct, tighten the Anamorphic Lens Set Screw (item #10) to secure the lens in place. (When viewed from the front, the rear opening on the anamorphic lens should appear as a tall, narrow oval.)



Focus: Finally, rotate the Focus Ring on the anamorphic lens to fine-tune the optical focus.



4. Operation

4.1 Using the On-Screen Menus

To display the Main Menu, press the **MENU** button on the remote control (Figure 2-5), DHD Controller front panel (Figure 2-3) or projector rear panel (Figure 2-2).

To select a menu item, use the ▲ and ▼ buttons on the remote control, DHD Controller front panel or projector rear panel to highlight it. Then, to confirm your selection, press **ENTER** on the remote control (or **SELECT** on the DHD Controller front panel or projector rear panel).

The VX-22d OSD menus are arranged hierarchically, as shown in Figure 4-1. Depending on the selected input source and signal characteristics, some menu options may not be available.

Input Source	Composite
	S-Video
	Component RCA (HD1)
	Component BNC (HD2)
	Component PC (HD3)
	RGB RCA (HD1)
	RGB BNC (HD2)
	RGB PC (HD3)
	HDMI 1
	HDMI 2
Aspect Ratio	16:9
	4:3
	Letterbox
	VirtualWide
	Cinema
	Virtual Cinema
Picture	Brightness
	Contrast
	Color
	Tint
	Sharpness
Input Position	Left/Right
	Up/Down
	Width
	Height
	Overscan
	Phase (RGB/Component signals only)
ISF Presets	Recall ISF Night
	Recall ISF Day
	Recall/Save Custom 1
	Recall/Save Custom 2
	Reset Custom 1 & 2 to Factory Default
Information (read-only)	Resolution
	Firmware Versions
	OSD Version

Note: Virtual Cinema is available only on VX-22d projectors equipped with the CineWide option (secondary anamorphic lens).

Calibration	ISF Night - Display Color	Gain
		Offset
		Gamma
		Color Temp
	ISF Night - Input Image	Brightness
		Contrast
		Color
		Tint
		Sharpness
	ISF Night - Input Color	Gain
		Offset
		Chroma Delay
		Noise Filter
	ISF Day - Display Color	Gain
		Offset
		Gamma
		Color Temp
	ISF Day - Input Image	Brightness
		Contrast
		Color
		Tint
		Sharpness
	ISF Day - Input Color	Gain
		Offset
		Chroma Delay
		Noise Filter
	Save ISF Settings	Back / Confirm
	Output Shift	Left/Right
		Up/Down
		Width
		Height
	Splash Timer	5 ... 60 sec.
	OSD Position	Horiz. / Vert. (0, 1, 2 ... 100)

Service	Test Video	Grey Bars 1 (horiz. ramp)	
		Grey Bars 2 (vertical ramp)	
		Color Bars 1	
		Color Bars 2	
	Display Device - Configure	Installation	Picture Orientation: Floor Front Ceiling Front Floor Rear Ceiling Rear
		Lens	Focus
			Zoom
			Shift
		Lamp Info (read-only)	Hours in use etc.
		Diagnostic	White, Red, Green, Blue, Yellow, Cyan, Magenta
	HD Format	HD 1 (RCA)	COMP or RGB
		HD 2 (BNC)	
		HD 3 (PC)	
	Triggers	I / II / III	
	Miscellaneous	Language	English, Français, Deutsch, Español or Italiano
		OSD Timer	0 or 5 ... 60 sec.
		Film Mode (SD sources only)	On / Off
	System Reset		
	Restore Saved Settings		

Figure 4-1. DHD Controller OSD Menu Structure for VX-22d

◄ *Main Menu*

The Main Menu is the starting point for accessing all projector functions.

(The Calibration and Service menus are hidden and not accessible until you enter a passcode.)

Runco Video
Input Source
Aspect Ratio
Picture
Input Position
ISF Presets
Information
Calibration
Service

◄ *Input Source*

From the Main Menu, select Input Source to choose a video signal source.

The active source is indicated by an arrow (>) to its left; in this example, Composite is the active source.

	Input Source
>	Composite
	S-Video
	Component RCA (HD1)
	Component BNC (HD2)
	Component PC (HD3)
	RGB RCA (HD1)
	RGB BNC (HD2)
	RGB PC (HD3)
	HDMI 1
	HDMI 2

◄ *Aspect Ratio*

To change the aspect ratio (size and shape) of the projected image, select Aspect Ratio from the Main Menu and press **ENTER** or **SELECT**. Select the appropriate aspect ratio for your screen size and the type of program material being viewed; refer to Table 4-1.

The currently-selected aspect ratio is indicated by a "☒" to its left; in this example, 16:9 is selected.

	Aspect Ratio
☒	16:9
☐	4:3
☐	Letterbox
☐	VirtualWide
☐	Cinema
☐	Virtual Cinema

Note

The aspect ratio selection is automatically saved for each input and resolution.

Table 4-1. Aspect Ratio Settings

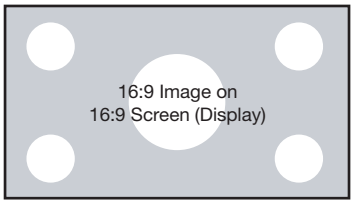
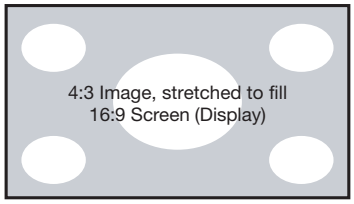
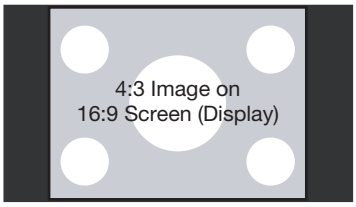
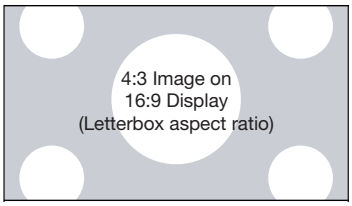
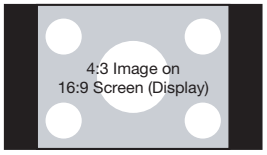
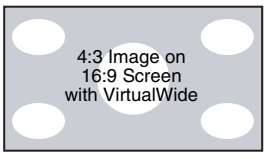
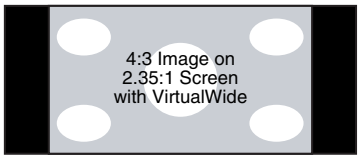
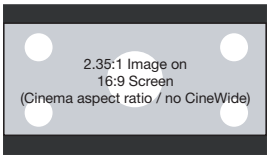
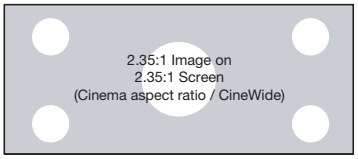
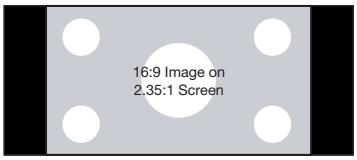
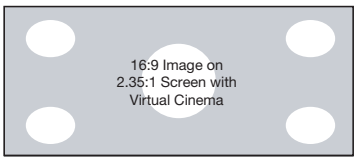
Aspect Ratio	Remote Control Key	Description	
16:9	16:9		Select 16:9 to view 16:9 DVDs and HDTV programs in their native aspect ratio.
			4:3 images are stretched horizontally to fit a 16:9 screen.
4:3	4:3		Standard 4:3 scales the input signal to fit in the center of the 16:9 screen. 4:3 is the aspect ratio used by computer monitors, standard television programming and most VHS video cassettes.
Letterbox	LBOX		Letterbox mode scales (zooms in on) a 4:3 image linearly (by the same amount on all sides) to fill a 16:9 display. Letterbox is best suited for viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.
VirtualWide	VWIDE		VirtualWide scales a 4:3 image NON-linearly (more on the sides than in the center) to fit a 16:9 screen.
			
			On a 2.35:1 screen, the image is centered between black bars on either side.

Table 4-1. Aspect Ratio Settings (continued)

Aspect Ratio	Remote Control Key	Description	
Cinema	CINEMA	 	Select Cinema to view 2.35 source material in its native aspect ratio. With a 16:9 screen and a non-CineWide projector (no anamorphic lens), the upper and lower portions of the screen are masked, but the geometry of the active image area is unchanged. With a 2.35:1 screen and a CineWide-equipped projector, the DHD Controller scales the 2.35:1 image so that the active image area fills the 16:9 chip surface, eliminating the black bars. The secondary, anamorphic lens then restores the proper geometry to the 2.35:1 image.
Virtual Cinema	VCINE	 	A 16:9 image is scaled NON-linearly (more on the sides than in the center) to fit a 2.35:1 screen. Virtual Cinema is available only on the VX-22d/CineWide.

Use the controls in the Picture Menu to calibrate your VX-22d for optimum picture quality.

The VX-22d has been designed to incorporate setup and calibration standards established by the Imaging Science Foundation (ISF). The ISF has developed carefully crafted, industry-recognized standards for optimal video performance and has implemented a training program for technicians and installers to use these standards to obtain optimal picture quality from Runco video display devices. Accordingly, Runco recommends that setup and calibration be performed by an ISF certified installation technician.

All signal types require separate processing. Therefore, you need to calibrate each DHD Controller input separately.

➤ ***Picture***

Picture
Brightness
Contrast
Color
Tint
Sharpness

Note

When you change a picture quality setting, save the change to a preset afterwards. Otherwise, the change will be lost when a different input is selected. (Picture quality settings are saved for each input separately.) For information about saving settings, refer to ***ISF Presets*** *on page 54.*

Although it may be possible to obtain satisfactory picture quality using the naked eye and regular program material, Runco recommends using the following calibration tools for best results:

- External test pattern source – Ovation Multimedia, Digital Video Essentials or AVIA test DVD or equivalent.
- A blue filter (provided with many test DVDs), for color level and tint adjustments.

Connect your test pattern source to the input that you are calibrating and proceed as follows. **Perform the adjustments in the order listed here.**

Brightness: On your external test pattern source, select a PLUGE pattern. (PLUGE is an acronym for "Picture Line-Up Generation Equipment.") Figure 4-2 shows a typical PLUGE pattern.

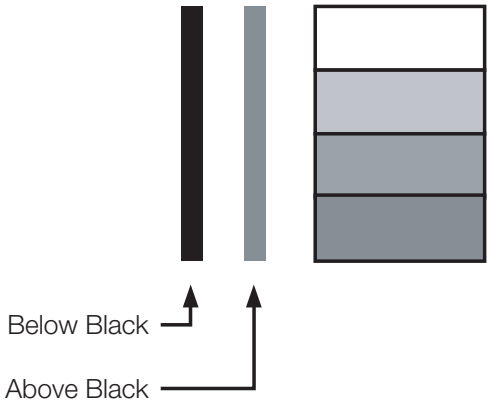


Figure 4-2. Typical PLUGE Pattern for Adjusting Brightness

PLUGE patterns vary but generally consist of some combination of black, white and gray areas against a black background. The example above includes two vertical bars and four shaded boxes.

Select Brightness from the Picture menu and press **ENTER** or **SELECT**. Adjust the brightness so that:

- The darkest black bars disappear into the background.
- The dark gray areas are barely visible.
- The lighter gray areas are clearly visible.
- The white areas are a comfortable level of true white.
- The image contains only black, gray and white (no color).

Contrast: On your external test pattern source, select a stepped, gray-bar pattern like the one shown in Figure 4-3.

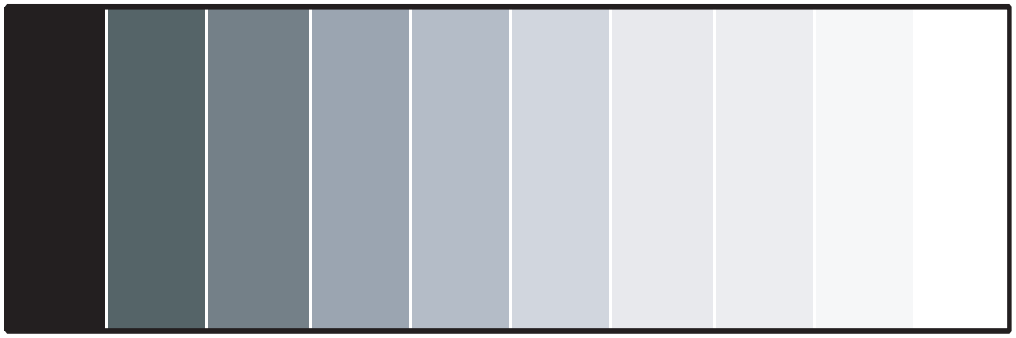


Figure 4-3. Typical Gray Bar Pattern for Adjusting Contrast

Select Contrast and press **ENTER** or **SELECT**. Adjust the contrast to a point just below which the white rectangle starts to increase in size.

Note

Brightness and contrast controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Color Saturation: On your external test pattern source, select a color bar pattern like the one shown in Figure 4-4.

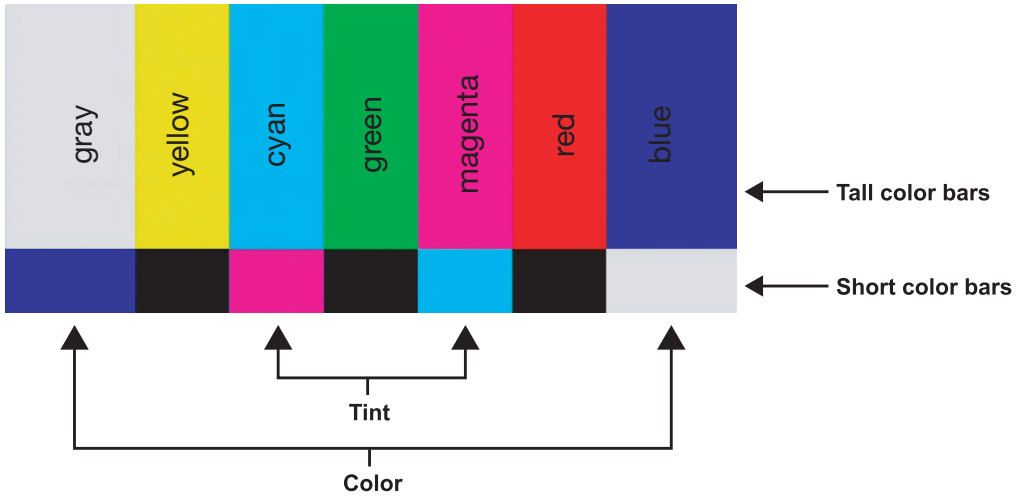
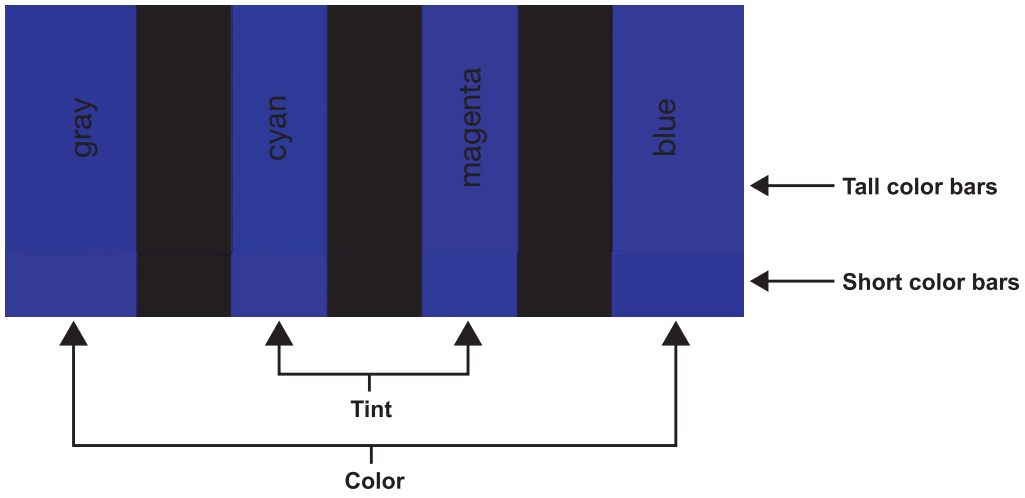


Figure 4-4. Typical Color Bar Pattern for Adjusting Color Saturation and Tint

Select Color and press **ENTER** or **SELECT**. While looking at the color bar pattern through a blue filter, adjust the color saturation level until the outermost (gray and blue) color bars appear to be a single shade of blue:



Tint: Tint or "hue" is essentially the ratio of red to green in the color portion of the image. When tint is decreased, the image appears redder; when it is increased the image appears greener. To set the tint, select Tint and press **ENTER** or **SELECT**. While looking at the color bar pattern through a blue filter, adjust the tint level until the cyan and magenta color bars (on either side of the green bar) appear to be a single shade of blue.

Note

Like the brightness and contrast controls, the color and tint controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Sharpness: “Sharpness” is the amount of high-frequency detail in the image. To adjust sharpness, select Sharpness from the Picture menu and press **ENTER** or **SELECT**. On your external test pattern source, select a pattern like the one shown in Figure 4-5. Adjust as needed, looking for white edges around the transitions from black to gray and differently-sized lines in the “sweep” patterns at the top and bottom. Lower the sharpness setting to eliminate them.

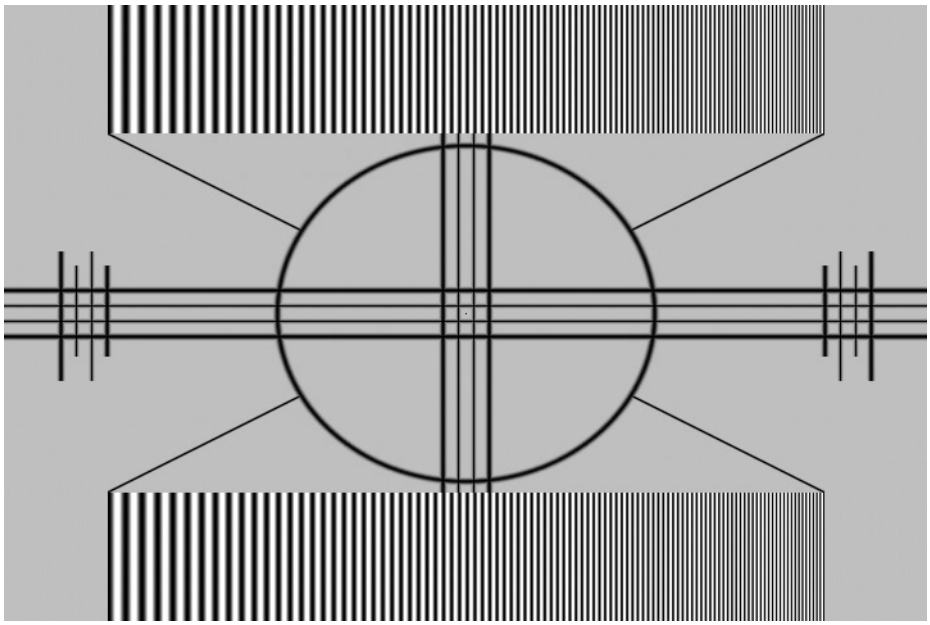


Figure 4-5. Typical Test Pattern for Adjusting Sharpness

Use the controls in the Input Position Menu to fine-tune the aspect ratio and image position for the current source.

◄ ***Input Position***

Input Position
Left/Right
Up/Down
Width
Height
Overscan
Phase

Note *The input position settings are automatically saved for each input and resolution.*

Left/Right: Select Left/Right from the Input Position menu to shift the projected image horizontally. Press ▶ to shift the image to the right; press ◀ to shift it to the left.

Up/Down: Select Up/Down from the Input Position menu to shift the projected image vertically. Press ▶ to shift the image upward; press ◀ to shift it downward.

Width: Select Width from the Input Position menu to change the projected image width. Press ▶ to increase the width; press ◀ to decrease it.

Height: Select Height from the Input Position menu to change the projected image height. Press ▶ to increase the height; press ◀ to decrease it.

Overscan: Image Overscan pushes the outside edge of the active picture area of the video signal out beyond the edge of the display area.

Some television programs are produced based on the assumption that older television sets may not display the outer edges of the broadcast picture area. Over scan effectively trims away these inactive, outer edges and enlarges the remaining portion of the image to fill the display area.

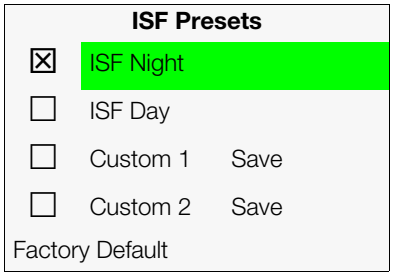
Select from 1% to 10% of Overscan, as desired.

For HDTV, DVDs and other video sources, Overscan is generally not necessary or desirable.

Phase: Adjust the phase if the image from an RGB or Component source shows shimmer or "noise." Pixel phase adjusts the phase of the pixel sampling clock relative to the incoming signal. The effect of this control is similar to that of a tracking control on a VCR.

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half on, half off" graphic image. (You may find that you can stabilize the image at more than one point. Use either setting in this case.)

ISF Presets ➤



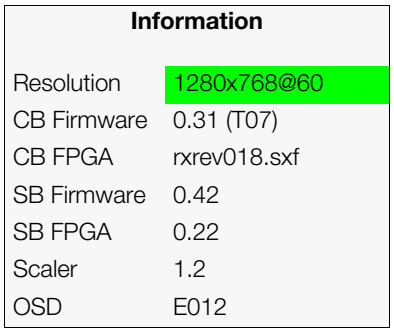
For each input, the VX-22d lets you save image quality settings as presets that you can recall at a later time. You can create up to four presets per input and resolution. Use the ISF Presets menu to recall saved image presets, or to save image settings in the "Custom 1" or "Custom 2" memory location. The currently-selected preset is indicated by a "☒" to its left; in the example shown here, ISF Night is selected.

You should save changes to any of the following settings to a preset; otherwise they will be lost when a new input source or resolution is selected:

- Brightness
- Contrast
- Color saturation
- Tint
- Sharpness

To reset the Custom 1 and Custom 2 image presets to their factory defaults, select Factory Default and press **ENTER** or **SELECT**.

Information ➤



Select Information from the Main Menu to display information about the current input signal (resolution, frequency, type et cetera) and installed firmware versions. Should you ever need to contact Runco Technical Support, this information will help them answer your questions or resolve product performance issues.

Use the Calibration menu to perform advanced picture quality adjustments. **This menu should be used by ISF-certified technicians only.**

◄ ***Calibration***

Calibration
ISF Night
Display Color
Input Image
Input Color
ISF Day
Display Color
Input Image
Input Color
Save ISF Settings
Output Shift
Splash Timer
OSD Position

Note *You must enter a passcode to access the Calibration menu.*

To recall the ISF Night or ISF Day settings, select “ISF Night” or “ISF Day” from the ISF Presets menu (see page 54) or use the corresponding buttons on the remote control.

ISF Night - Display Color: Use the Display Color settings to adjust the color balance at the projector output. These settings are saved independently for each input.

- **Gain:** Use the Gain controls to correct color imbalances in the bright areas of the image. A good way to do this is to use a test pattern consisting mostly of solid white areas, such as an 80 IRE “window” pattern. If the white areas contain traces of red (Pr), green (Y) or blue (Pr), decrease the Gain for that color.
- **Offset:** Use the Offset controls in the White Balance sub-menu to correct color imbalances in the dark areas of the image. A good way to do this is to use a test pattern consisting mostly of dark gray areas, such as a 30 IRE “window” pattern. If the gray areas contain traces of red (Pr), green (Y) or blue (Pr), decrease the Offset for that color.
- **Gamma:** “Gamma” is a global setting that determines how gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting helps to optimize blacks and whites while ensuring smooth transitions for the “in-between” values utilized in other grays. Unlike “Brightness” and “Contrast” controls, the overall tone of your images can be lightened or darkened without changing the extremes and all images will be more vibrant while still showing good detail in dark areas.

  In all but the most unusual situations, the appropriate “Color Temp” selection (see below) will produce accurate colors and a satisfying contrast level. However, it is sometimes necessary to adjust the red, blue and green gamma curves individually. To do this, select Gamma from the Display Color sub-menu and use the left- and right-arrow buttons to manipulate the on-screen slidebars.
- **Color Temp:** Select Color Temp from the Display Color menu to adjust the color temperature. The default setting is appropriate for most situations. Higher settings produce a “bluer” picture.

ISF Night - Input Image: The Input Image controls are similar to those in the Picture menu, but are accessible only by entering the Calibration menu passcode. This makes it possible to restore the picture quality settings to what they were when the projector was installed, simply by recalling the “ISF Night” preset.

ISF Night - Input Color: The Input Color controls are similar to those in the Display Color menu (see above), but adjust the color balance of the incoming signal. These settings are also saved independently for each input.

- **Gain/Offset:** Refer to ***ISF Night - Display Color***, above.
- **Chroma Delay:** use the Chroma Delay control to correct a mis-aligned image from a Composite, S-Video or Component video source. Chroma delay in an image causes color shifts to occur to the left of the vertical edge transitions, producing artificial shadows or a “halo” effect. If necessary, adjust this setting to eliminate them.
- **Noise Filter:** To apply noise filtering to the input signal, select Noise Filter from the Input Color menu. The Noise Filter is useful for clearing up noisy images from 480i video sources.

  Use the left- or right-arrow buttons to select the desired amount of noise reduction, keeping in mind that higher settings (which reduce high frequencies) may also “soften” the image.

ISF Day - Display Color: Refer to ***ISF Night - Display Color***.

ISF Day - Input Image: Refer to ***ISF Night - Input Image***.

ISF Day - Input Color: Refer to ***ISF Night - Input Color***.

Save ISF Settings: Whenever you make a change to the ISF settings, you should always save it. Select Save ISF Settings from the ISF Calibration menu to do this. In the event you ever have to perform a System Reset, you can restore the saved ISF settings by selecting Restore Saved Settings in the Service menu. (System Reset and Restore Saved Settings are described on page 58.)

Output Shift: The controls in the Output Shift menu are similar to those in the Input Position menu, except that they change the characteristics of the output signal. These settings are saved independently **for each aspect ratio**.

Splash Timer: Select Splash Timer from the Calibration menu to set the amount of time the Runco/ISF logo “splash” screen appears when you turn on the projector. The range is from 5 to 60 seconds, in one-second increments.

OSD Position: To adjust the position of the OSD, select OSD Position from the Calibration menu and press **ENTER** (or **SELECT**).

Press ▲ or ▼ to select “Hor.” or “Ver.” Then, press ◀ or ▶ change the position.

Use the Service menu to access advanced projector configuration settings. **This menu should be used by ISF-certified technicians only.**

◄ ***Service***

Service
Test Video
Display Device
HD Format
Triggers
Miscellaneous
System Reset
Restore Saved Settings

Note *You must enter a passcode to access the Service menu.*

Test Video: Select Test Video from the Service Menu to access the internal test patterns on the VX-22d. Four patterns are available: Grey Bars 1 (horizontal ramp), Grey Bars 2 (vertical ramp), Color Bars 1 (solid bars) and Color Bars 2 (SMPTE "checkerboard" pattern).

Press **MENU** to exit test pattern mode.

Tip *You can also use the **PATTERN** button on the projector rear panel or DHD Controller front panel to enter and exit test pattern mode.*

Display Device: The options in the Display Device menu allow you to change the picture orientation and perform lens adjustments.

- **Installation:** Select Installation from the Display Device menu to change the picture orientation to suit the method of installation (Floor Front, Floor Rear, Ceiling Front or Ceiling Rear).
- **Lens:** Select Lens from the Display Device menu to access the motorized lens controls. Refer to ***Primary Lens Adjustments*** on page 38.
- **Lamp Info:** Select Lamp Info from the Display Device menu to obtain information about the currently-installed lamp: its serial number, number of "strikes" (attempts to ignite) and number of hours in use.
- **Diagnostic:** Select Diagnostic from the Display Device menu, then select Red, Green, Blue, Yellow, Cyan or Magenta to display only that color (simulating a filter of that color). This can be useful for calibration or measurement purposes.

  To restore the normal picture (all colors), select White.

HD Format: Select HD Format from the Service menu to choose the default color space for the source signals on the HD1, HD2 and HD3 inputs. Select COMP (component) or RGB. The DHD Controller assumes this color space when you "direct-select" an HD input using the left-arrow and right-arrow (◀ or ▶) buttons on the projector rear panel or DHD Controller front panel, or the **HD1**, **HD2** or **HD3** buttons on the remote control unit.

HD Format				
HD1	☒	COMP	☐	RGB
HD2	☒	COMP	☐	RGB
HD3	☐	COMP	☒	RGB

You can override this setting by using the OSD to select an HD input (refer to ***Input Source*** on page 47). For example, if you select COMP for HD2 here and the input signal changes to RGB, select "RGB BNC" from the Input Source menu to enable the VX-22d to properly display that signal.

Note *When you change the default color space for an HD input, it takes effect the **next** time you select that input (not immediately).*

Triggers: Select Triggers from the Service menu to configure the 12-volt trigger outputs. You can assign one or more trigger outputs to each aspect ratio. Those triggers are then activated by selecting that aspect ratio.

If your projector is equipped with the Runco CineWide with AutoScope system, assign at least one trigger output (the same one to which the lens motor is connected) to the Cinema and Virtual Cinema aspect ratios.

Miscellaneous: Select Miscellaneous from the Service menu to set the following options:

- **Language:** Select Language from the Miscellaneous menu and press the up- or down-arrows to select the OSD Language (English, Français, Deutsch, Español or Italiano).
- **OSD Timer:** Select OSD Timer from the Miscellaneous menu to set the OSD Timer, which controls how long the menus remain on-screen after selecting them. Select from 5 to 60 seconds, in one-second increments. Or, set the timer to 0 (disabled) if you want the menus to remain on-screen indefinitely.
- **Film Mode:** Use Film Mode to smooth out moving images from interlaced, standard-definition (SD) sources. In most cases, the VX-22d detects the proper "pull-down" rate and vertical frequency. However, if your source is jittery and/or tearing you may wish to enable Film Mode (ON) to ensure stable processing for that source.

System Reset: To reset ALL projector and controller settings (including image settings) back to their factory defaults, choose System Reset from the Service menu.

A confirmation message appears, reminding you to save your settings before you perform the reset, so that you can restore them afterwards. If you have done this, select Confirm to continue with the reset. Otherwise, click Back to cancel.

Caution

This action is not undoable. Proceed with caution! *Before you perform a System Reset, save your "Custom" ISF presets (page 54) and ISF Day/Night presets (page 56).*

Restore Saved Settings: Following a System Reset, select Restore Saved Settings, then select Yes to apply all previously-saved settings to the projector and DHD Controller.

5. Maintenance and Troubleshooting

5.1 Lamp Replacement

The lamp should be replaced when it reaches the end of its life (typically 2000 hours), or sooner if a noticeable degradation in brightness occurs. When you replace a lamp, you should replace the filters as well.

For lamp or filter replacement, please contact your nearest Runco authorized service center or Runco dealer. Do not attempt to replace the lamp yourself!

WARNING

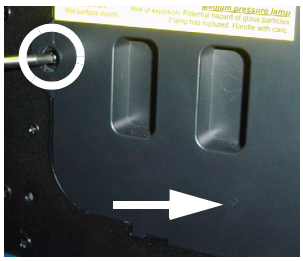
The VX-22d lamp is under high pressure. Handle it with great care at all times. Lamps may explode if dropped or mishandled.

Never attempt to disassemble the lamp casing or dispose of the lamp casing in any manner other than by returning it to your Runco dealer.

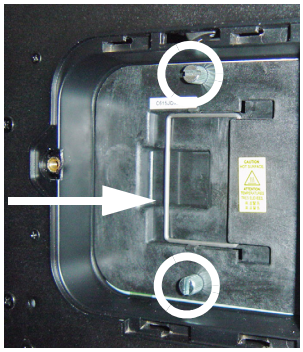
If the lamp breaks, leave the area immediately and stay away for at least 30 minutes. Ventilate the room to allow the mercury vapor to disperse.

If you inhale the mercury vapor, see a physician immediately.

1. Turn off the projector and unplug the power cord. Allow the projector to cool down for approximately 45 minutes prior to removing the lamp assembly for replacement.
2. Loosen and remove the rear Lamp Cover screw.

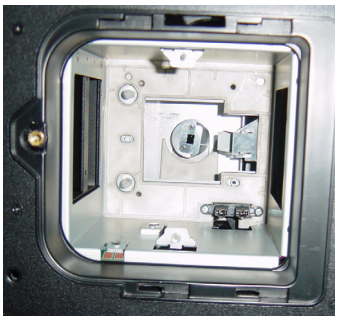


3. Slide the Lamp Cover in the direction of the arrow to remove it.
4. Loosen the two, captive lamp assembly mounting screws using a coin or a large, flat-blade screwdriver.



5. Grasp the lamp assembly handle and pull gently, removing the lamp module from the projector housing.

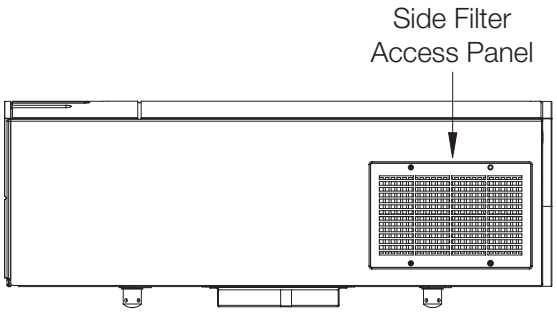
6. Install the new lamp module.
7. Replace the lamp cover and re-tighten all screws.



5.2 Filter Replacement

Whenever you replace the lamp – or more often if the projector is installed in an extremely dusty environment – you should also replace the filter located at the right side of the projector.

1. Loosen the four captive screws holding the filter access panel in place. Then, remove the panel.
2. Pull the filter out of the projector and discard. Do not reuse filters.
3. Insert the new filter with the pleats facing in and the foam-covered side facing out.
4. Replace the filter access panel and tighten the screws to secure it.



5.3 Troubleshooting Tips

Table 5-1 provides some general guidelines for troubleshooting problems you may encounter with the VX-22d. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact Runco Technical Support.

Table 5-1. Troubleshooting Chart

Symptom	Possible Cause(s)	Solution
The projector does not turn on after initial installation. The power LED on the front of the DHD Controller lights red after you press the power button.	• The DHD Controller is connected to the VX-22d incorrectly or not at all. • The VX-22d is not plugged in or the AC outlet is not active.	• Verify the DVI-DL cable connection from the DHD Controller to the VX-22d (Figure 3-7). • Ensure that the VX-22d is plugged in and that the AC outlet is active.
The projector and DHD Controller are both on, but there is no video image on-screen.	• Incorrect source selection. • Source component is not turned on.	• Select the correct source. • Turn on the source.
A projected image from a DVD is split or otherwise scrambled.	• DVD player is set to progressive scan mode.	• Turn off progressive scan on the DVD player.
Image is too bright and/or lacks definition in the bright areas of the image.	• Contrast is set too high.	• Lower the contrast setting.
Image appears “washed out” and/or dark areas appear too bright.	• Brightness is set too high.	• Lower the brightness setting.
Colors in the image are swapped; for example, reds appear blue or vice versa.	• The Red/Pr, Green/Y or Blue/Pb outputs from the source are connected to the wrong inputs on the DHD Controller.	• Ensure that the source outputs are connected to the correct DHD Controller input.
Image geometry is incorrect.	• Incorrect aspect ratio selection.	• Select the aspect ratio that best matches the source image and screen size (refer to Table 4-1).
The projector will not turn back on after it was powered down, or the image disappears during operation.	• The projector will not turn on for two minutes after power-down, to protect the lamp. • The lamp has failed.	• Wait two minutes until the LED at the front of the DHD Controller turns red. • Replace the lamp.

Notes:

6. Serial Communications

6.1 RS-232 Connection and Port Configuration

To interface the DHD Controller with a home theater automation/control system or a PC running terminal emulation software, connect it to your control system or PC as shown in Figure 3-13. **Use a null-modem cable.**

If you are using a PC to communicate with the DHD Controller:

1. Start a terminal session on your PC using a terminal-emulation program, such as HyperTerminal.
2. Configure the PC serial port as follows: no parity, 8 data bits, 1 stop bit and no flow control. Set the baud rate to 19200, to match that of the DHD Controller RS-232 port.
3. Press **<Enter>.** You should see a command prompt (>) in the terminal window.
4. Type a command from among those listed in Table 6-1 and press **<Enter>.**

6.2 Serial Command Syntax

- Commands are in ASCII format and are not case-sensitive; `on` and `ON` are equivalent.
- For a command that takes no parameters, type the command followed by a carriage return; for example, to turn on the system, type `ON`**<Enter>**.
- For a command that takes a parameter, type the command, one or more spaces and the desired value followed by a carriage return; for example, to switch to the S-Video input, type `SSRC 1`**<Enter>**.
- When you enter a valid command, the DHD Controller executes it. When you send an on/off, input selection, aspect ratio or image preset command, the DHD Controller also responds with an acknowledgment on the command line. For example, when you issue the command `SAR 2,` the DHD Controller responds with `Letterbox` on the command line.
- When you enter a misspelled or otherwise invalid command, the DHD Controller ignores it and responds with `Invalid Command` on the command line.
- When you send a command followed by values outside the valid range for that command, the DHD Controller ignores it and responds with `Invalid Parameter` on the command line.

Table 6-1 lists the serial commands supported by the DHD Controller and the responses it sends back to the control system or PC.

Table 6-1. Serial Commands

Command	Description	Response
`off`	Turns projector off	`Powering Down`
`on`	Turns projector on	`Powering Up` `Gennum Init Complete`

`rev`	Display system firmware version information:
	
	`> rev`
	`* Runco Gennum Scaler Board *`
	`* Rev 0.28 (T01) 05 Jan 2007 *`
	`File Name: Runco_Gennum.ncd`
	`Created: 21 Dec 2006 - 10:42:40`
	`Device: XC3S100EVQ100`
		(see description)

Input Selection Commands		
`SSRC 0`	Selects the Composite video input	`Composite`
`SSRC 1`	Selects the S-Video input	`S-Video`
`SSRC 2`	Selects the Component RCA (HD1) input	`Component RCA`
`SSRC 3`	Selects the Component BNC (HD2) input	`Component BNC`
`SSRC 4`	Selects the Component PC (HD3) input	`Component PC`
`SSRC 5`	Selects the RGB RCA (HD1) input	`RGB RCA`
`SSRC 6`	Selects the RGB BNC (HD2) input	`RGB BNC`
`SSRC 7`	Selects the RGB PC (HD3) input	`RGB PC`
`SSRC 8`	Selects the HDMI 1 input	`HDMI 1`
`SSRC 9`	Selects the HDMI 2 input	`HDMI 2`
Aspect Ratio Commands		
`SAR 0`	Selects the 16:9 aspect ratio	`16:9`
`SAR 1`	Selects the 4:3 aspect ratio	`4:3`
`SAR 2`	Selects the Letterbox aspect ratio	`Letterbox`
`SAR 3`	Selects the VirtualWide aspect ratio	`VWide`
`SAR 4`	Selects the Cinema aspect ratio	`Cinema`
`SAR 5`	Selects the Virtual Cinema aspect ratio	`VCinema`

Table 6-1. Serial Commands (continued)

Command	Description	Response
Image Preset Commands		
SISF 0	Loads “ISF Night” image preset	ISF Night
SISF 1	Loads “ISF Day” image preset	ISF Day
SISF 2	Loads “Custom 1” image preset	Custom 1
SISF 3	Loads “Custom 2” image preset	Custom 2
Menu Navigation Commands		
The following serial commands are meant to emulate buttons on the remote control or DHD Controller front panel. Each button has its own serial command, so effectively it is as if you were using the IR remote only you’ll be doing so via serial commands. These commands provide active OSD responses just like the IR remote.		
ENTR	**ENTER** (or **SELECT**) button	(none)
EXIT	**EXIT** button	
MENU	**MENU** button	
MND	Down-Arrow (▼) button	
MNL	Left-Arrow (◀) button	
MNR	Right-Arrow (▶) button	
MNU	Up-Arrow (▲) button	
Picture Adjust Commands		
The following serial commands are meant to emulate the discrete picture adjustment buttons on the remote control unit. Use them in conjunction with MNL and/or MNR to make picture adjustments. For example, to increase Brightness by five increments, send this sequence of commands: MBR **<Enter>** MNR **<Enter>** MNR **<Enter>** MNR **<Enter>** MNR **<Enter>** MNR **<Enter>** EXIT **<Enter>**		
MBR	Adjust Brightness	(none)
MCOL	Adjust Color Level	
MCON	Adjust Contrast	
MTIN	Adjust Tint	

Notes:

7. Specifications

7.1 VX-22d Specifications

Table 7-1 lists the VX-22d specifications.

Table 7-1. VX-22d Specifications

Projector Type:	Digital Light Processing (DLP), 3-chip, 16:9 SuperOnyx DMD
Native Resolution:	1920 x 1080 (16:9)
Aspect Ratios:	Refer to Table 7-2
Video Standards:	Refer to Table 7-2
DTV Compatibility:	480i/576i, 480p, 576p, 1080i 50/60, 720p 50/60,1080p 24/50/60, 1080psf
Scan Frequency:	Horizontal: 15 - 100 kHz Vertical: 28 - 78 Hz
Picture Size (16:9 Screen):	Recommended Width: 72 - 120 in. Maximum Width: 250 in.
Throw Distance (Factor x Screen Width):	Refer to Table 3-3
Horizontal and Vertical Offset:	Refer to Table 3-4
Lamp:	300W UHP
Estimated Lamp Life:	2000 hours
Input:	DVI-DL (Dual-Link) with HDCP (from DHD Controller)
Controls:	Built-in keypad

Table 7-1. VX-22d Specifications (continued)

Brightness and Contrast:	**Cinema Standards Measurement System (CSMS) Specifications** - Brightness: 58.7 foot-Lamberts (fL) - Contrast Ratio: 321:1 These measurements are taken from the projector in a controlled, home theater environment. All measurements are made to ANSI/NAPM IT7.228-1997 specifications using the Photo Research PR-650 SpectraColorimeter and Minolta LS-100 Luminance Meter, Video Essentials test DVD and a 1.3 gain, 72-inch wide screen. The projector is calibrated to a color temperature of 6,500K and has a minimum of 150 hours of usage. The foot-Lambert (fL) is the unit of measurement used in commercial movie theaters to express image brightness at the screen surface. The Society of Motion Picture and Television Engineers (SMPTE) specifies 16 fL as the target image brightness for film-based projectors using an open gate (without film in the projector). More importantly, today SMPTE specifies 12 fL as the target image brightness in Digital Cinema theaters. The foot-Lambert measurement is dependent on screen size, screen gain and projector light output. **Home Theater Calibration Specifications** - Light Output: 1391 ANSI Lumens - Contrast Ratio: 321:1 These specifications are obtained by calibrating the projector as described above for CSMS measurements. **Industry-Standard Specifications** - Light Output: 2850 ANSI Lumens - Contrast Ratio: 4000:1 These are typical projector brightness and contrast specifications found in most companies' sales literature. Runco includes these measurements in its literature to allow for direct comparison with other manufacturers' projectors. These measurements are typically taken at 9,000K to 13,000K to get expected performance data when the projector is used in professional, commercial and industrial displays.
Power Requirements:	100 to 240 VAC (auto-sensing), 50/60 Hz, 530 Watts
Operating Environment:	41°F to 95°F (5°C to 35°C), 0% to 90% humidity (non-condensing)
Dimensions:	See Figure 7-1
Weight (without lens):	99.21 lbs. (45.00 kg)
Regulatory Approvals:	Complies with FCC, CE C-Tick
Limited Warranty:	Projector: Two (2) years parts and labor from the date of delivery to the end user. Lamp: 1000 hours or six (6) months, whichever comes first.
Specifications are subject to change without notice.	

7.2 DHD Controller Specifications

Table 7-2 lists the DHD Controller specifications.

Table 7-2. DHD Controller Specifications

Aspect Ratios:	4:3, Letterbox, 16:9, VirtualWide, Cinema, Virtual Cinema
Video Standards:	NTSC, NTSC 4.43, PAL B/G/H/I/M/N , SECAM
Output Resolution:	1080p
Inputs:	(1) Composite (1) S-Video (1) HD Video, R (Pr), G (Y), B (Pb), H, V - RCA connectors (1) HD Video/Computer, R (Pr), G (Y), B (Pb), H, V - BNCs (1) HD Video/Computer, R (Pr), G (Y), B (Pb), H, V - 15-pin D-Sub connector (2) HDMI with HDCP
Output:	DVI-DL (Dual-Link) with HDCP
Control Options:	- Discrete infrared remote - Serial commands via RS-232 interface - Front-panel controls
RS-232 Communication Parameters:	19200 bps, no parity, 8 data bits, 1 stop bit, no flow control
Trigger Outputs:	(3) +12 VDC, each rated at 750 mA and thermal fuse-protected
Bandwidth:	150 Mega Samples per Second (MSPS)
Power Requirements:	100 to 240 VAC (auto-sensing), 50/60 Hz, 160 Watts
Operating Environment:	41°F to 95°F (5°C to 35°C), 0% to 90% humidity (non-condensing)
Dimensions:	Width = 17.50 inches (444.5 mm) Depth = 11.19 inches (284.1 mm) Height = 3.75 inches (95.3 mm)
Weight:	13.0 lbs. (5.90 kg)
Regulatory Approvals:	Complies with FCC, CE C-Tick
Limited Warranty:	Two (2) years parts and labor from the date of delivery to the end user.

Specifications are subject to change without notice.

7.3 VX-22d Dimensions

Figure 7-1 shows the VX-22d dimensions (all dimensions are in inches).

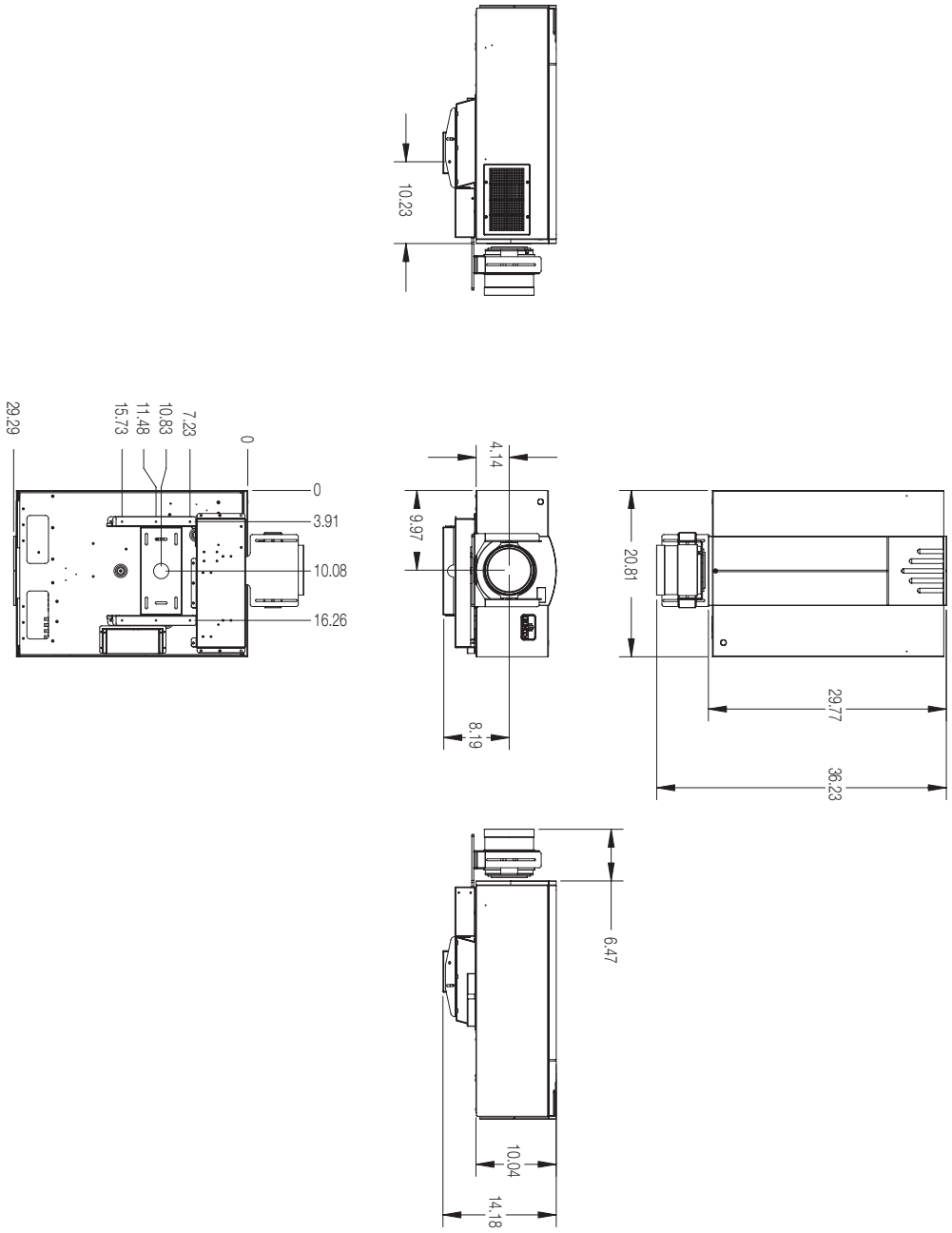


Figure 7-1. VX-22d Dimensions (with Ceiling Mount and CineWide/AutoScope Options)

SERIAL NUMBER

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